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INDIA RUBBER WORLD

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Carbon Black Fire Hazard

Paul Talmey[1]

CARBON black is the nearest thing to a non-inflammable material which will burn. Burn it does, but without the smoke or flame or rage customarily associated with the name of fire, and generally without damage to the containing structure. To correct misconceptions, and because Godfrey L. Cabot, Inc., has had just enough practical experience to provoke an otherwise latent interest into action, the Cabot company has examined all the aspects of the subject.[2]

Test fires created under controlled experimental conditions at the Factory Mutual Test Station at Everett, Mass., confirmed previous small-scale tests performed by the Underwriters' Laboratories, Inc., in Chicago. Twelve hundred pounds of Spheron carbon black were stacked as 48 25-pound bags in the center of a specially designed house of steel and concrete construction at the Test Station.

The first attempt at firing this pile was abortive. Though crumpled newspapers next to the bags were lit off, only the paper bags ignited. Flames from the burning paper bags failed to ignite the carbon black. Twenty-four hours later, because the pile was cold, this test was halted, and the experiment was started over again. A fresh stack of 1200 pounds of bagged black had been prepared; ignition was attempted by poking a long steel stake, about 1⅛ inches in diameter, heated at one end to an orange-red heat, into the middle of the pile. Although the stake was heated and forced into the pile four times, it was not until the last attempt that we were able to detect definite signs of ignition of the carbon black itself.

Both pile and ceiling temperatures, as measured by recording thermocouples, started a slow upward climb. Four and one-half days after the start of this test, the temperature at the ceiling, approximately four feet above the top of the pile, was at a maximum of 200° F., and the pile temperature was on the way to its peak of 1165° F. which was not reached until a total of nine days had elapsed. During the fourteenth day of this experiment the fire finally gave up its last calory and was declared out.

Because black burns so slowly and with so little heat, carbon black fires are difficult to detect. Ordinary thermostats which operate at a fixed predetermined temperature are useless. Ordinary sprinkler systems are most likely to operate days after a fire has started and at a time when water will do most damage and least good.

Only one of the three thermostats located at the ceiling about four feet above the stack, which operated on the quick rise of temperature created by the burning of paper bags (not of carbon black), proved to have any merit. Of the other two instruments of the fixed temperature type, one set at 175° F. operated two days after the start of the second test. The third, set at 212° F., never operated.

The fire hazard of carbon black is not appreciably greater than that associated with any other material, packed in the same manner, whether or not the contained material is, of itself, inflammable. Three fires, which by coincidence have all occurred within the relatively short period of eight years (short at least compared to the sixty years during which we have manufactured carbon black), have been the bad luck, but valuable experience of this company. It is of most significance that all of these fires have occurred in carbon black packed in paper bags, leading to the conclusion, firmly supported by extensive experiments, that such fire hazard as does exist lies almost wholly in the hazard represented by the paper bags themselves and not in the carbon black.

Ignition Possibilities

Ignition may occur from a variety of sources, in fact from anything which will ignite paper. The three fires experienced had three different causes. The first, eight years ago, started beneath oil soaked planking which made up the flooring of a packing house. The principal damage was to thoroughly non-combustible, steel packing equipment. The second fire began in an electric power cutlet. The third fire required no less an ignition source than a bolt of lightning.

So slowly does carbon black burn that, in the most recent instance, three days elapsed between the time the warehouse building was struck and the discovery of the fire which was only made known by the appearance of spilled black seeping out at the base of the warehouse door. In all of these fires little heat was developed, so little in fact that men were able to work at the burning pile of black without discomfort from the heat.

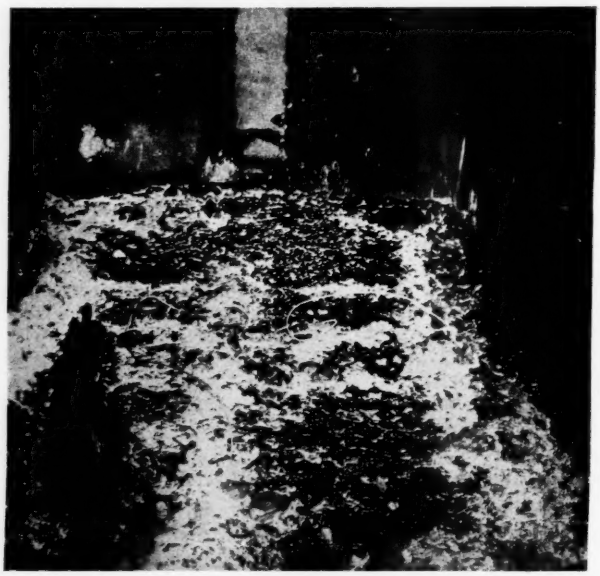
Practical experience and the observation of the above

[1] Technical Dept., Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass.

[2] Specific technical work has been carried out by the Inspection Department, Associated Factory Mutual Fire Insurance Cos.; the Underwriters' Laboratories, Inc., the United States Bureau of Mines; and Cabot personnel.

Start of Second Fire Test Showing Stacking of Bags; Wire in Foreground Is Connected to Thermocouple and Recording Millivoltmeter

Two Days Later, and 24 Hours after Last Ignition Attempt; End of Stake Used for Ignition Can Be Seen Protruding in Lower Foreground



Fire Out 13½ Days after Start of Test; Nearly All Black Consumed

tests proved that carbon black burns without smoke or flames, except from the paper of the bags; paper bags ignite easily, carbon black does not; only rate-of-rise thermostats capable of operating on the initial flare up of the paper are of any value. The conclusions drawn from actual experience, from the 1200-pound tests, and from small-scale tests all agree.

There is no positive method of igniting carbon black, Even when the material is soaked in gasoline and the latter ignited, the black does not catch. Though carbon black sometimes can be ignited from the flames of the paper bags in which it is packed, this is not inevitable. A statistical analysis of the last actual fire indicated that paper alone was consumed. Though one-half million pounds of carbon black were affected, little, if any, actually burned. The most likely method of igniting carbon black (though none too certain as we found above) is to immerse red-hot metal deep into the black. This usually does work. Cigarettes or other objects which are themselves burning are generally extinguished before they can ignite carbon black.

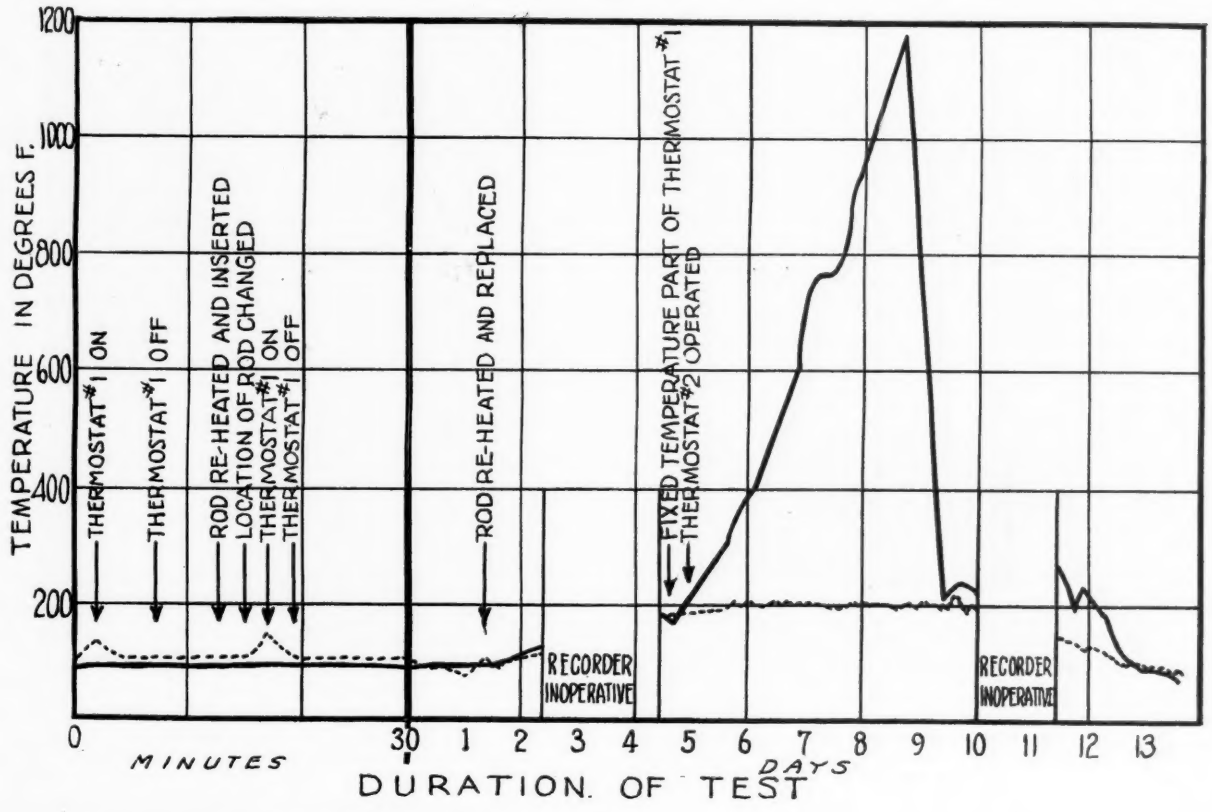
Carbon black is electrically conductive. Its dust will collect in and around light sockets, power outlets, and any exposed electrical equipment. Motors are particularly susceptible; the dust collects in cracks formed in the insulation by the flexing of stator conductors. Resulting short circuits are as much a hazard to stacks of stored carbon black as to other materials packed in the same fashion.

Electric lights around which bags may, by error, be piled are a particularly dangerous thing. Carbon black is an excellent thermal insulator. Since heat from the bulb cannot escape, the temperature will rise in the enclosure formed by the stack. Eventually the paper of the bags will ignite.

The spontaneous combustoin of carbon black is a myth of uncertain origin. During the Underwriters' Laboratories experiments carbon black was held at a temperature of 212° F. for six months. No combustion occurred. Other tests on the oxidation rate of carbon black at various temperatures confirmed the conclusion that carbon black will not spontaneously ignite.

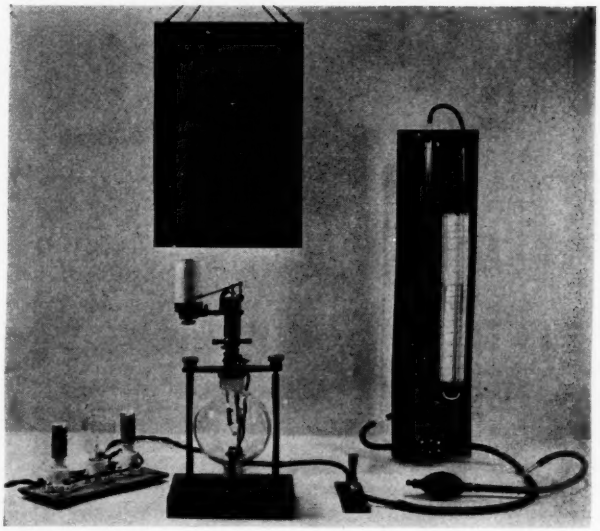
To prevent carbon black fires, follow the usual rules of good housekeeping, remembering that any medium which will ignite paper bags can cause considerable handling expense even though the black itself does not burn.

Bulk black has never accidentally caught fire; therefore any extensive set of rules which might be set forth here would be without foundation in actual experience. Since,



Temperature Record of Second Fire Test

Solid Line Denotes Temperature within Pile; Broken Line, Temperature at Ceiling; Arrows Indicate Time at Which Various Thermostats Operated



Clement-Frazer Dust Explosion Bomb Consists of a Pyrex Globe Containing a Hot Wire Ignitor and Surmounted by a Pressure Indicating Mechanism. Dust Cloud Is Formed by Impinging a Jet of Compressed Air against Pan Containing Dusty Material. Explosion Pressure Is Registered on Drum. Attempts Thus to Explode Carbon Black Were Futile*

*See Technical Paper 141, Department of Interior, 1917, on "Laboratory Determination of the Explosibility of Coal Dust and Air Mixtures," by J. K. Clement and J. M. Lawrence.

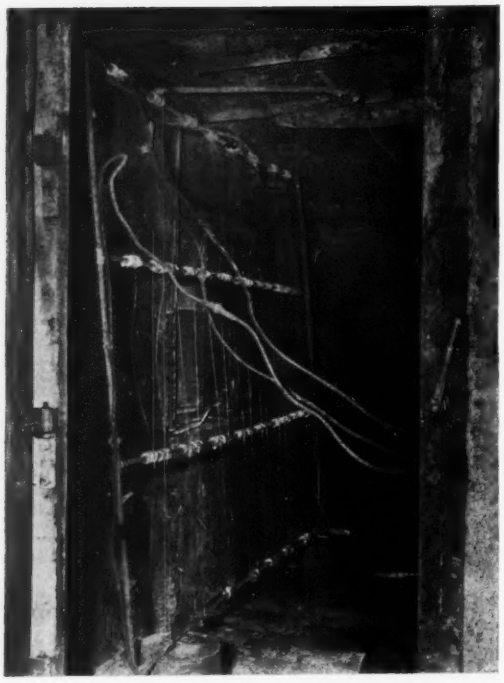
however, experimental evidence has shown that fairly large pieces of red hot metal can ignite carbon black, either in bulk or bags, vigilance should not be relaxed solely because no such fires have occurred.

Dust Hazard

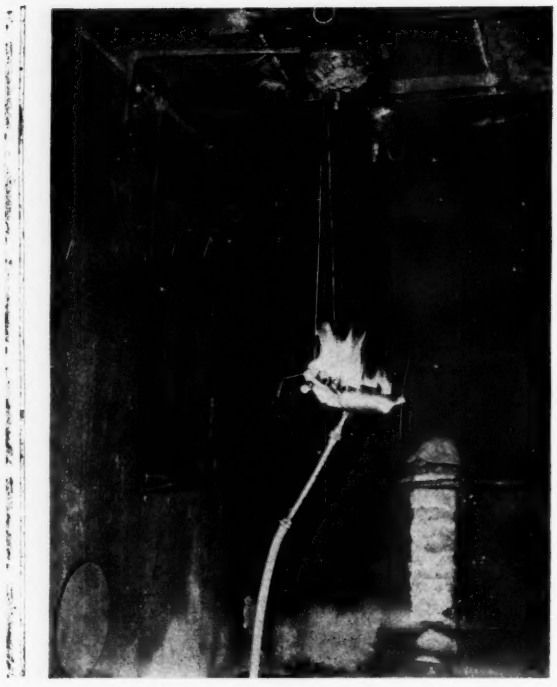
A false idea has persisted for many years that carbon black dust was an industrial explosion hazard. There is no adequate experimental evidence or any practical evidence of any such hazard. There has never been, within the knowledge of this company, an explosion of carbon black dust either during its manufacture or during its use by a consumer. To allay unnecessary fears, however, and to make the investigation of fire hazard complete, this company has undertaken a number of experiments to determine the actual explosion hazard of carbon black dust.

The first of these experiments, conducted during the latter part of 1937 by the United States Bureau of Mines, was designed to determine whether or not Spheron could be inflamed in such a fashion as to promote the propagation of an explosion. The Bureau of Mines, using its standard laboratory apparatus consisting of a vertical tube furnace heated to 1382° F., found that when carbon black was blown through this furnace, no inflammation of the dust could be obtained. The sample of Spheron tested contained 5% volatile matter, and the screen analysis showed 7.6% of the samples passed a 200-mesh screen. A second sample of Spheron having even more extraordinary dustiness (24.6% passed a 200-mesh screen) was found to be no more inflammable than the first.

Experiments conducted by the Factory Mutual Laboratories of Boston, employing the Clement-Frazer dust explosion bomb, showed that carbon black dust produced no explosion pressure. This is a standard method which has



Electric Grid Ignitor Consists of 100-Foot Nichrome Wire Wound on Pipe Frame Six Feet High and Electrically Heated to Cherry Red; Failed to Explode Carbon Black



Double-Burner Gas Flame Failed to Explode Carbon Black; Hemispherical Cups, from Which Dust Is Thrown by Compressed Air, May Be Seen at Ceiling

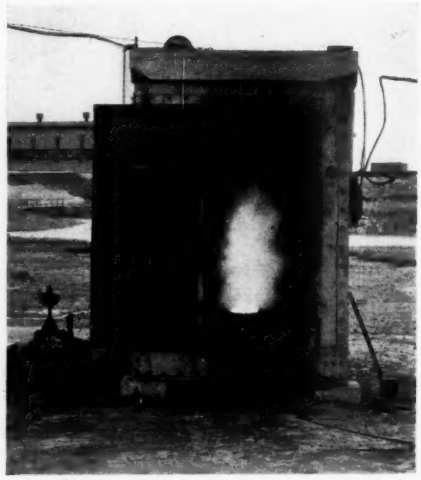
been employed for years to determine the industrial hazard of various dusts.

The above experiments having exhausted the usual small-scale methods, large-scale tests were performed to exhaust every possibility. In an explosion house at the Factory Mutual Test Station at Everett, Mass., fluffy carbon black was thrown out to form a dust cloud. No explosion could be obtained when ignition by either an electrically heated grid or a gas flame was attempted. The flame of black gunpowder did cause the dust to explode. Cornstarch dust, which would explode at every attempt using any of these ignition means, served as a control.

Throughout a period of years the Factory Mutual Test Station has conducted a large number of tests in this same building in all of which the electric grid was employed as the ignition source. Long experience has shown that whenever an explosion could be caused by the grid, explosions actually occurred in industry. Likewise, when the electric grid failed to ignite a dust cloud of a given material, no explosions of this material are known to have occurred in connection with its manufacture or use.

Spheron clouds, not being true dust clouds, will not explode under any circumstances, with or without gunpowder. Because carbon black dust of any sort cannot be exploded by any means other than gunpowder, the former is not an industrial hazard. Likewise it can be concluded that gunpowder and carbon black should not be stored together.

It is inconceivable that the necessary conditions to obtain an explosion of fluffy carbon black dust could occur in an industrial establishment. Specifically, fluffy carbon black dust (not Spheron) exploded at concentrations of 5 pounds/1000 cubic feet of air when one ounce of gunpowder was ignited in the center of the cloud, but it would not explode at a concentration of 3 pounds/1000 cubic feet of air or when only one-half ounce of gunpowder was ignited in the cloud at any concentration.



Gunpowder (One Ounce) Can Explode Carbon Black Dust Cloud; 500-Cubic-Foot Explosion House Is Six Feet by Ten Feet by Eight Feet Four Inches High and of Steel and Concrete Construction

Carbon black, when mixed with dusts having a known explosion hazard, apparently acts as an inert material, neither inhibiting nor promoting the propagation of the explosion. The number of possible combinations, however, render it virtually impossible to predict the behavior of every such combination. It is, therefore, advisable when such conditions may exist to test the explosion hazard of each mixture. In any event, in any such mixtures, the primary hazard does not lie in the carbon black dust itself.

Conservation of Rubber in Germany

NAZI Germany's program of rubber conservation is reviewed by E. G. Holt, Chief, Leather and Rubber Division, Bureau of Foreign and Domestic Commerce, in the first edition of the "Industrial Reference Service, Part 10, Rubber and Its Products," a new service, issued in 14 parts to cover all commodities and offered to industry by the Bureau of Foreign and Domestic Commerce. Some of the most salient points of Mr. Holt's article, which is an excellent treatise on this timely subject, are outlined below.

Synthetic Rubber

In a coordinated plan of conservation, affecting all branches of the German rubber industry, the development of synthetic rubber was the keystone of the entire program. Research, begun in 1925, was intensified in 1933, and in 1934, I. G. Farbenindustrie announced the development of Buna. In late 1936 the I. G. Bayer pilot plant at Leverkusen was turning out about 80 tons monthly, and in early 1937 the first commercial plant at Schopau was reputedly operating at 200 tons a month. In 1937, Continental Gummiwerke at Hannover was making 200 tires a day and 25% of its mechanical goods from Buna; two other firms were also experimenting with its application. In June, 1936, the Rubber Control Board assumed direction over distribution of synthetic rubber. In May, 1937, a heavy import duty on natural rubber (averaging $50,000,000 a year for the next two years, based on imports) removed the economic barriers to and provided funds for large-scale synthetic operations.

In 1937 German plans to manufacture "Thiokol" at Saaru were announced, and probably production began in 1938. A new factory, capable of producing 25,000 tons of Buna annually was started at Schopau with expected operation in May, 1939. In May, 1938, another plant was started at Huls, Westphalia, and was expected to be producing early in 1940, with a capacity equaling or exceeding the Schopau unit. The Schopau plant was originally capitalized at 30 million marks—later increased to 50 million. The Huls plant was originally capitalized at 30 million marks.

The ultimate goal of synthetic rubber production in Germany was alleged to be 6,000 tons monthly, enough to enable getting along without imports in case of national emergency. It is believed production in 1934 was under 10 tons, in 1935 less than 100 tons, in 1936 less than 1,500 tons, in 1937 perhaps 4,000 tons, in 1938 probably 10,000 tons, and in 1939 probably 25,000 tons, with late 1940 capacity presumably in the neighborhood of 60,000 tons. In addition to Buna and "Thiokol" various other rubber-like plastics have been acquiring significance.

Scrap and Reclaimed Rubber

As early as 1934 imports of scrap rubber were increased, and exports were practically embargoed by an export duty on certain types. Imports and exports, based on the official trade statistics of Germany, are shown in the following table:

GERMAN FOREIGN TRADE IN SCRAP RUBBER
(In Thousands of Pounds)

Year	Imports	Exports	Net Imports
1931	5,200	8,323	— 3,123
1932	3,628	7,499	— 3,871
1933	3,965	6,146	— 2,181
1934	17,500	2,538	+14,962
1935	17,312	101	+17,211
1936	22,925	161	+22,764
1937	90,000	54	+89,946
1938	36,000	0	+36,000

The average aggregate consumption of crude rubber, reclaim, and other materials used in rubber manufacture in Germany would probably total above 100,000 tons a year. Nearly half this weight, or over 40,000 tons a year, might be subsequently collectible as scrap. Very possibly, at the end of 1937 and up to the outbreak of the war, Germany had an inventory above 125,000 tons of scrap rubber.

Actual facts on the German reclaiming industry are not available. Observers believed the industry had a capacity of 12,500 tons in 1934 and 24,000 tons in 1936. It seems that the reclaiming industry may *now* have capacity and materials for making 35,000 tons annually for several years. The German reclaiming problem is complicated by the use of synthetic rubber, necessitating careful separation. In May, 1939, it was reported that technical difficulties in reclaiming Buna had been overcome in Germany.

Natural Rubber

Net imports of natural rubber averaged 24,980 long tons annually in 1922-26; 42,200 tons in 1927-31; and 58,630 tons in 1932-36. At the end of 1936 stocks may have been little more than 10,000 tons. Net imports of rubber in 1937 reached 98,200 tons, in 1938 declined to 90,200 tons, and through July, 1939, were reported at 57,692 tons. Probably on September 1, 1939, German stocks were less than 65,000 tons, and imports since that time have been very low.

Apparent Position Today

Prior to the war there were a multiplicity of regulations affecting the purchase, use, and manufacture of rubber and also affecting trade organization and distribution of goods. Promptly upon the declaration of war by the United Kingdom and France, two German decrees provided for confiscation of rubber, asbestos, and products thereof and regulated their future distribution.

Germany today appears to be nearly self-sufficient from the standpoint of rubber, possessing ample resources in production of synthetic and reclaimed rubber, and has enough crude rubber to carry for a considerable period, if not indefinitely. Also Germany has developed synthetic cell-wool for cotton, produces sufficient sulphur, manufactures necessary quantities of carbon black from naphthalene, and recovers zinc from ashes and slag for zinc oxide.

The measures adopted for rubber conservation in Germany do not necessarily indicate steps which, in national emergency, would be necessary or desirable for the United States. However, in order to accumulate stocks of natural rubber as rapidly as possible, we could now be using more reclaimed rubber for tires and perhaps in certain

(*Continued on page* 55)

Census of Manufactures—1939

Preliminary Report on Rubber Products Not Elsewhere Classified, Comparing 1939 with 1937 . . . . . .

THIS is the fourth in the series of 1939 Census of Manufactures reports relating to the rubber industry and is one of the three rubber reports to which the Bureau of Census gave the right of way at the request of the National Defense Advisory Commission. The three previously issued reports, covering tires and inner tubes, rubber boots and shoes, and reclaimed rubber, were presented in our October issue, pp. 37-38. EDITOR'S NOTE.

Manufacturers of rubber products, other than boots and shoes and tires and inner tubes, reported a moderate increase in production, and slight increases in employment and wages for 1939, as compared with 1937, according to preliminary figures compiled from returns of the Census of Manufactures for 1939 and released November 15 by Director William Lane Austin, Bureau of the Census, Department of Commerce.

This industry, as constituted for census purposes, embraces establishments primarily engaged in the manufacture of rubber heels; soles, including composition or fiber; soling strips; mechanical soft rubber goods such as belts, hose, and tubing, plumbers' supplies; hard rubber goods such as battery boxes, combs, cigar and cigarette holders, and druggists' sundries; rubber tile, flooring; rubberized fabrics and clothing; sponge rubber products; tire sundries and repair materials; and tire retreading done on a factory basis.

The 1939 Census of Manufactures is the first census for which employes of rubber manufacturing plants who were primarily engaged in distribution, construction, etc., activities have been called for separately on the schedules. Employes of the plants reported as engaged in distribution and construction activities in 1939 are not included in this preliminary report, but will be included in the final report.

The wage earners primarily engaged in manufacturing in this industry in 1939 numbered 50,667, an increase of 8% compared with the 46,914 reported for 1937, and their wages, $53,357,735, exceeded the 1937 figure, $52,345,742, by 1.9%.

The value of products of the industry for 1939 amounted to $264,525,200, an increase of 12.7% as compared with $234,774,018 for 1937.

Summary statistics for the industry for 1939 and 1937 are presented in Table 1. Detailed statistics on production are presented in Table 2. All figures for 1939 are preliminary and subject to revision.

TABLE 1. SUMMARY FOR THE INDUSTRY: 1939 AND 1937

(Because they account for a negligible portion of the national output, plants with annual production valued at less than $5,000 have been excluded since 1919)

	1939	1937	% of Increase
Number of establishments	519	411	26.3
Salaried personnel[1]	7,407	6,677	10.9
Salaries[1, 2]	$18,303,498	$14,992,048	22.1
Wage earners (average for the year)[3]	50,667	46,914	8.0
Wages[2, 3]	$53,357,735	$52,345,742	1.9
Cost of materials, supplies, fuel, purchased electric energy, and contract work[2]	$122,875,735	$115,755,036	6.2
Value of products[2]	$264,525,200	$234,774,018*	12.7
Value added by manufacture[4]	$141,649,465	$119,018,982	19.0

[1] No data for employes of central-administrative offices are included.
[2] Profits or losses cannot be calculated from the census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.
[3] The item for wage earners is an average of the numbers reported for the several months of the year and includes both full-time and part-time workers. The quotient obtained by dividing the amount of wages by the average number of wage earners should not, therefore, be accepted as representing the average wage received by full-time wage earners.
[4] Value of products less cost of materials, supplies, fuel, purchased electric energy, and contract work.
*Revised.

TABLE 2. PRODUCTS, BY KIND, QUANTITY, AND VALUE: 1939 AND 1937

(Statistics in this table show the total figures for these products, including data for those made in the "Boots and Shoes, Rubber" and "Rubber Tires and Inner Tubes" industries)

	1939	1937
Rubber products not elsewhere classified, total value	$341,613,427	$333,642,556*
Heels:		
Pairs	253,538,781	295,081,194
Value	$14,016,436	$16,285,139
Soles including composition or fiber:		
Pairs	146,520,900	72,476,284
Value	$15,113,561	$10,750,044
Soling strips and top-lift sheets:		
Square feet	8,338,017	8,072,411
Value	$1,727,815	$2,075,999
Rubberized fabrics, made for sale as such:		
Automobile and carriage:		
Square yards	6,925,676	6,006,465
Value	$1,710,225	$2,122,853
Raincoat:		
Square yards	12,216,969	21,374,062
Value	$2,126,449	$4,873,452
Hospital sheeting:		
Square yards	3,857,247	2,982,123
Value	$1,639,519	$1,072,522
All other, value	$16,178,430	$13,562,630
Mechanical rubber goods:		
Belts and belting:		
Conveyer and elevator:		
Pounds	21,601,048	15,759,803
Value	$7,791,747	$6,901,352
Transmission, flat:		
Pounds	15,734,803	21,793,187
Value	$7,304,147	$13,381,938
V-belts:		
Motor vehicle:		
Pounds	10,959,745	
Value	$5,281,057	
Other (including V-flat and V-cog):		21,153,490
Pounds	9,358,068	$11,776,615
Value	$7,431,716	
All other, value	$1,131,676	
Rubber hose:		
Garden:		
Pounds	45,533,630	46,932,725
Value	$6,471,085	$7,058,709
Airbrake, airline, and other pneumatic:		
Pounds	13,143,099	13,486,496
Value	$4,474,897	$4,914,841
Fire hose:		
Pounds	12,628,955	9,345,767
Value	$5,460,007	$4,726,025
Oil and gasoline:		
Pounds	8,886,508	
Value	$4,433,704	$19,218,945
All other hose, value	$17,329,130	
Rubber tubing:		
Pounds	11,438,326	22,961,182
Value	$2,608,622	$4,491,613
Rubber packing:		
Pounds	13,483,266	14,046,511
Value	2,955,353	$3,550,830
Washers, gaskets, valves, pump sleeves, and liner strips:		
Pounds	18,689,308	15,017,089
Value	$7,137,343	$5,035,917
Jar rings:		
Gross	9,758,831	6,117,233
Value	$2,667,432	$1,954,964
Insulation products:		
Rubber and friction tape:		
Pounds	25,809,269	21,112,965
Value	$4,338,993	$4,538,355
Molded articles for motor vehicles (vibration and sound):		
Pounds	39,840,987	60,420,110
Value	$10,385,021	$13,223,241
Rubber-covered rolls:		
Printers' rolls, value	$1,915,919	$4,854,772
All other, value	$2,968,083	

*Revised.

(*Continued on page 55*)

Rubber in Compression[1]

E. G. Kimmich[2]

THE effects of shape and surface conditions of rubber used in compression have remained somewhat of a mystery because of the apparently conflicting results often obtained. It is to be hoped that the work herein described will (1) explain some of the difficulties encountered, (2) establish a simple and reasonably accurate procedure for predetermining the compression stress-strain performance of many of the commonly used shapes, (3) encourage an extension of this work to include more complicated shapes, and to provide further refinement of the results.

Compression uses of rubber doubtless far exceed in number the shear and tension uses for industrial applications and warrant much work in determining the relations involved, at least to the extent of establishing empirical rules of sufficient scope and accuracy for practical use.

The erratic nature of compression test results has made it difficult to correlate the data reported in the technical articles on this subject. It is herein indicated that much of this difficulty may be explained by the condition of the surfaces, the manner of applying the load, discrepancies in hardness measurements, variations in the actual stiffness of the rubber used, and the fact that the stress-strain graph is not a straight line.

Surface Conditions

When rubber is compressed between plates, there is a tendency of the rubber to move outwardly from the center of the contact area. This movement may be resisted completely at the pressure plate surfaces by bonding the rubber to the metal; it may be resisted almost completely with roughened surfaces; or it may be resisted practically not at all if a very little lubricant, such as petrolatum, is applied to the surfaces. If the lateral movement at the pressure plates is restricted more in one case than in another, a difference in stiffness may be indicated where no actual difference exists in the rubber itself.

Figure 1 illustrates the effect of surface conditions. These tests were made on a single piece of rubber under various conditions, (*A*) fully bonded to metal by brass plate adhesion, (*B*) cut from the metal and held with sandpaper, (*C*) clean, tacky rubber surface against polished steel plates, (*D*) lightly dusted with sulphur to simulate a bloomed condition and tested with average finished plates, (*E*) dusted with talc, (*F*) rubbed with graphite, (*G*) lubricated with petrolatum. The last three were made with polished steel plates. With so large a difference in stress-strain test results definitely attributable to surface lubrication or the lack of it, it is reasonable to conclude that accidental partial lubrication such as dust, bloom, wax, or grease and the degree of roughness of the pressure plates will explain some of the erratic results where sufficient care has not been taken to eliminate these variables.

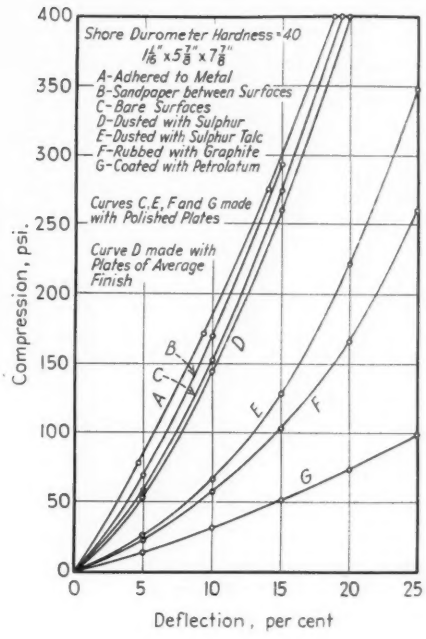


Fig. 1. Effect of Surface Conditions on Compression Deflection of Rubber

Load Application

Speed of load application seems to make little difference in the ordinary testing machine speed ranges, usually 1/8-inch to two inches per minute. Rapidly repetitional loading or impact loading usually causes an increase in apparent stiffness which varies with the speed of impact or frequency of vibration. This paper is confined to so-called "static" or very slow speed test machine results. Even in static tests it is important not to draw precise conclusions from the first application of the load. About ten applications are needed to reach a reasonably constant value, but the purpose is well served ordinarily when three load applications are used. The work herein reported, except where otherwise noted, shows the results of the third application of load.

Stiffness and Hardness Measurements

Considerable confusion has resulted from the terminology. Hardness is properly defined either as the relative ability of one material to scratch the surface of another, or as the relative resistance to surface indentation. Neither of these concepts meets the need of the engineer who wishes to design a compression piece of rubber. The term "modulus" has been used to express the relative resistance of rubber pieces in resisting deformation, but this term is not completely satisfactory because of the curvature of the stress-strain graph. "Rigidity" would be acceptable if it were not so closely identified with shear stresses as in the term "modulus of rigidity."

Brown[3] has recently advocated the term "stiffness" which appears to be best qualified to indicate the resistance to deformation of a piece of rubber under compression loads. Brown has also discussed the fact that "compression" itself is hardly a correct term, but it is commonly used and understood in the sense employed herein.

The only measurement of the resistance of rubber to deformation that, at present, even approaches a universal language, is the Shore durometer scale of hardness and

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[1] Presented at the Meeting of A.S.T.M. Committee D-11 on Rubber Products, Atlantic City, N. J., June 28, 1940. Reprinted from *ASTM Bulletin*, Oct., 1940, pp. 9-14, through courtesy of American Society for Testing Materials, Philadelphia, Pa.

[2] Mechanical Goods Dept., Goodyear Tire & Rubber Co., Inc., Akron, O.

[3] Roy Brown, "Engineering Properties of Rubber in Compression," a paper presented June, 1940, at a meeting of the Society of Automotive Engineers, White Sulphur Springs, Va.

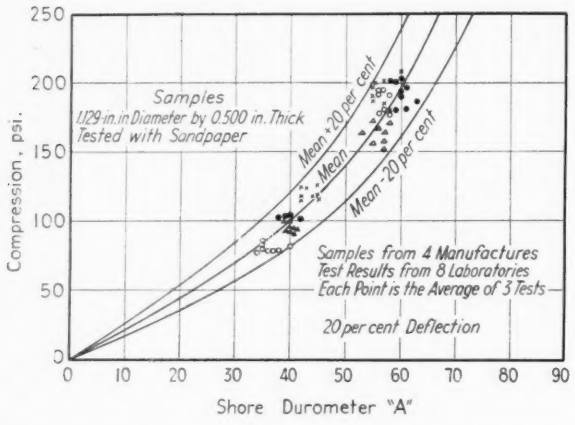

Fig. 2. Comparison of Durometer and Compression-Deflection Measurements

Tests Conducted by Technical Committee A of Committee D-11

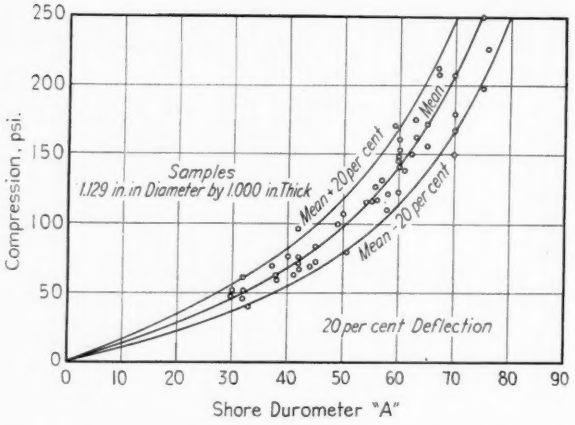

Fig. 3. Comparison of Durometer and Compression-Deflection Measurements

Tests Made in Goodyear Laboratory and Cover Wider Range of Stiffness Than in Fig. 2

much of the reported data is based on such measurements. However both the instruments and the manner of their use have been very inaccurate.

It is very common occurrence to find a lack of agreement by as much as five points on the same piece of rubber by various persons using different durometers. It is unfortunate that there has not been developed a standard method of calibration of these instruments and a standard method of use.[4] A point apparently ignored in discussion of Shore hardness measurements is that a five-point variation is equivalent to 15 or 20% in actual stiffness as measured in a compression-deflection test. When it is considered that larger disagreements than five points are not rare (and at times are as high as 10 or 12 points) the effect on comparisons of compression tests and the difficulty of meeting the users' requirements are easily seen.

In no way does this statement discredit the value of the durometer to the rubber industry. A standardized calibration and improved method of use would go far toward eliminating these difficulties. Larrick[5] presented a very useful paper showing that it is entirely practicable to improve the accuracy of durometer measurements.

On the other hand it has not been established that any indentation test could give a completely reliable report of the compressive characteristics of a piece of rubber. Therefore consideration is now being given to the adoption of standard methods of compression-deflection tests designed to supplement all ordinary hardness measurements.[6] Obviously such a test will not be so conveniently used as a pocket hardness instrument, and a small portable device will doubtless continue to be used for rough checking.

Wherever in this paper durometer readings are cited, the present general lack of precision of such measurements should be remembered. Figures 2 and 3 show that the degree of correlation between durometer hardness and compression deflection is not better than 20% plus or minus from the mean. The tests in Figure 2 were conducted by Technical Committee A on Automotive Rubber of the Society's Committee D-11 on Rubber Products in eight laboratories and on eight compounds, each point being the average of three tests. Figure 3 shows similar data taken in the Goodyear laboratories on our own compounds with samples twice as thick.

[4] Subcommittee XVII on Rubber Products for Absorbing Vibration, of Committee D-11 on Rubber Products, is at present considering standardization of calibration and use of durometers.

[5] Lewis Larrick, "The Standardization of Durometers," *Proceedings, A.S.T.M.*, Vol. 40 (1940).

[6] Tentative Methods of Test for Compression-Deflection Characteristics of Vulcanized Rubber (D 571—40 T), 1940 Supplement, Part III, to Book of A.S.T.M. Standards.

Variations Due to Cure

The well-known heat insulating qualities of rubber occasion much difficulty in obtaining uniform vulcanization throughout thick pieces. Usually two-inch thickness is considered the commercial maximum, although thicker pieces are successfully cured by long, carefully controlled "step" cures. The actual stiffness varies considerably with the cure, and cures are selected to obtain optimum values of the characteristics most important in use.

Thus, where low compression set is important, longer cures are ordinarily used than where maximum tensile strength and stretch are the most important properties.

Stress-Strain Curves

The fact that stress is not proportional to strain in rubber causes much difficulty of a type that is absent completely with materials like steel. It is common practice to assume that the graph is a straight line up to 20 to 25%,

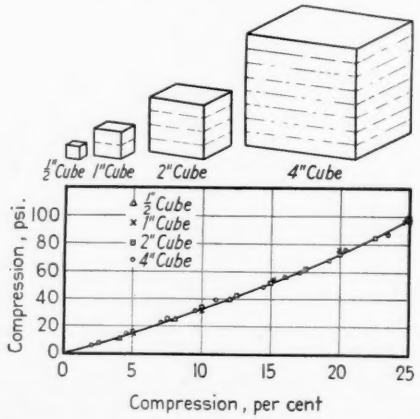

Fig. 4. Compression Tests of Several Sizes of Cubes Prepared from One Slab of Rubber ½-Inch Thick, Having a Shore Durometer Hardness of 40

Note That These Tests Prove That Similar Pieces of One Compound, Uniformly Cured Require the Same Unit Load to Give Equal Percentage Deflection

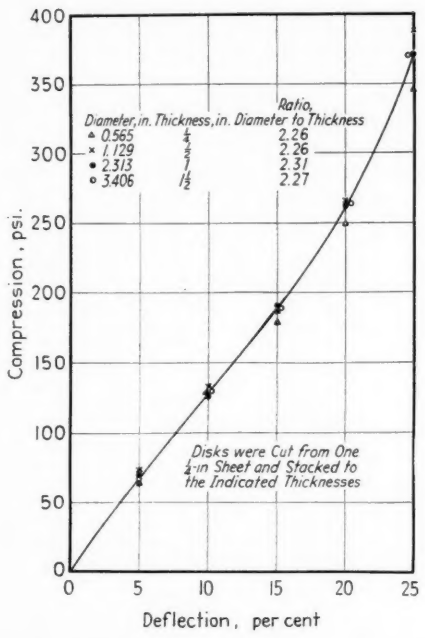

Fig. 5. Compression-Deflection Tests of Similar Disks or Cylinders. Shore Durometer Hardness=65

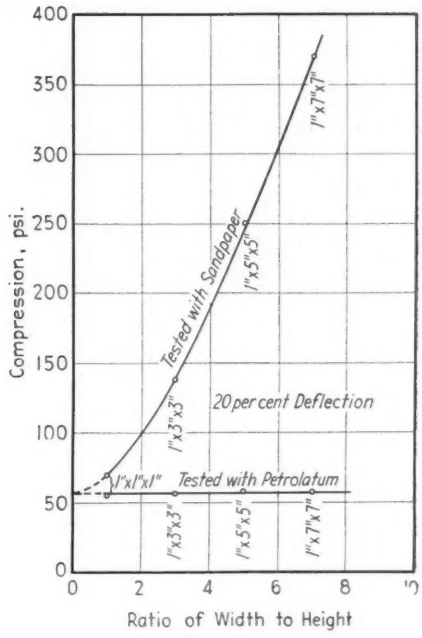

Fig. 6. Compression-Deflection Tests of Square Slabs Having a Shore Durometer Hardness of 40, Referred to Ratio of Width to Height. Slabs Are Included in Fig. 9

and in many cases this introduces no large error. In thin wide pieces the limits within which this approximation is permissible may be much below 20% deflection. Figures 1, 4, and 5 show the curvature of typical compression stress-strain curves.

Compression of Similar Shaped Pieces

It should be considered axiomatic that similarly shaped pieces will give the same percentage deflection with equal unit compressive loads. When this rule does not hold in actual test, it is likely that one of the difficulties explained above has caused the discrepancy. To check this, with such causes of error eliminated so far as practicable, ½-inch thick slabs of rubber of 40 Shore durometer hardness were cut into pieces that permitted the assembly of ½, 1, 2, and 4-inch cubes. Figure 4 shows that a range of 1 to 8 in linear dimensions of the cubes, or a range of 1 to 512 in volume did not cause any deviation from this rule. It was further confirmed by testing a series of disks assembled from a ¼-inch thick slab of compound of 65 Shore durometer hardness, with results as shown in Figure 5. In these tests the joints do not gap open, are obviously under compression and, therefore, do not affect the results. This rule of proportionality pertaining to similar shaped pieces permits accurate conclusions from scale models if cure variations are allowed for.

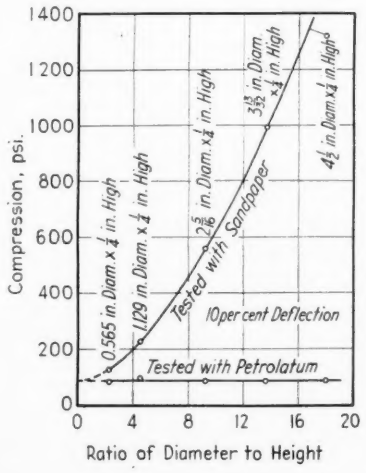

Fig. 7. Compression-Deflection Tests of Disks Having a Shore Durometer Hardness of 65, Referred to Ratio of Diameter to Height

Shape Factors

Inasmuch as published empirical rules for shape factor correction did not seem to be adequate, we approached the problem with an attempt to group various shapes into classifications each one of which would have its own shape factor. Thus we intended to allow for the shape and intended to use the rule of proportionality for the size of the piece in question. Early trials showed the same type of discrepancies within any one such group, but with improvement in testing technique we began to obtain satisfactory results, or at least reasonable explanations for the deviations.

Square slabs, cubes, and square columns were considered as one classification of shapes, and the ratio of width to height was used as a shape factor for this group. Figure 6 shows one such experimental curve. Disks or cylinders were similarly studied as another shape classification represented in Figure 7 where the relative resistance to compressions is plotted as a function of the ratio of the diameter to the height.

Figures 6 and 7 also show results of tests on the same pieces using petrolatum and polished steel plates. From these tests, we may conclude: (1) that shape within the limits studied makes no difference in unit compressive

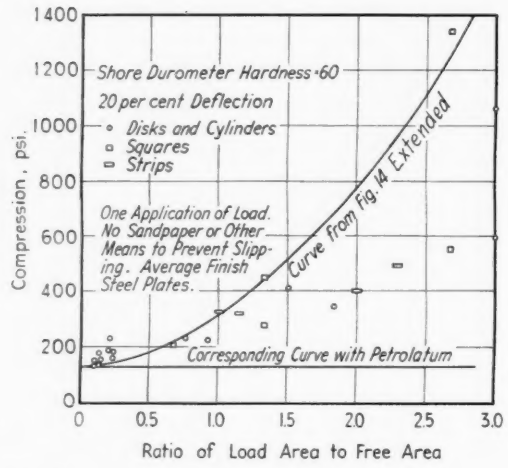

Fig. 8. Compression-Deflection Tests Made in 1934 to 1935

load for a given percentage deflection when the surfaces are thoroughly lubricated, (2) that complete restriction to lateral motion at the loading plates greatly stiffens the piece when the ratio of width to height is large, (3) that as the relative thickness or height increases, the surface condition becomes less important and that with low shape factors the effect almost disappears. (4) that the restricted and lubricated curves extended toward the load axis must become tangent to each other and must intercept the load axis at this tangent point (obviously a shape factor of zero cannot be had, but the zero point is useful in defining the curves and assisting in fully comprehending the effect of shape), and (5) that any partial lubrication would result in a curve lying between these two lines as limits.

This approach promised success, but indicated the need of much tedious testing to obtain separate empirical rules for all common shapes. We were then led to reconsider the rule set forth by Keys[7] in 1937 in which he used the ratio of one loaded area to the free area at the sides as a shape factor. In his paper he states that he applied it mainly to square slabs and cubes but found some measure of success with other shapes. Later Hirshfeld and Piron[8] wrote that Keys' shape factor method has serious limitations. Our subsequent work, however, indicates that this type of shape factor is the most satisfactory yet proposed and that the limitations cited by Hirshfeld and Piron are not necessarily as serious an objection as indicated by them.

[7] Walter C. Keys, "Rubber Springs," *Mech. Eng.*, May, 1937, pp. 345-49.
[8] C. F. Hirshfeld and E. H. Piron, "Rubber Cushioning Devices," A.S.M.E., *Transactions*, 59, pp. 471-91 (1937).

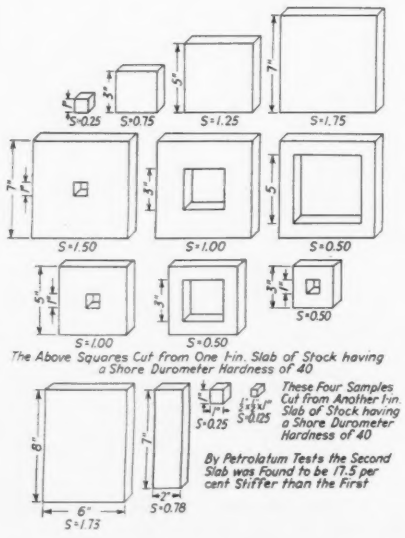

Fig. 9. Dimensions of Pieces Used in Fig. 10

Applying this rule to cubes, square slabs, and columns with width a and height t, we have for S as a shape factor:

$$S = \frac{a^2}{4at} = \frac{a}{4t}$$

Similarly for disks or cylinders of diameter d and height t, we have

$$S = \frac{\pi d^2}{4\pi dt} = \frac{d}{4t}$$

Note that these values of S are merely one-fourth the factors previously used in our work. Therefore the shape factors S are identical in *effect* with those used by us in Figures 6 and 7. Now if the ratio of load area to free area can be proved to meet the requirements of any shape having parallel loading faces and sides normal to the faces, it will be very useful indeed.

When we tried to apply this rule to a number of unpublished tests made by our company in 1934 and 1935, it was thought at that time not to apply very well. Figure 8 shows some of this work in relation to the ratio of load to free areas. Such erratic results have been typical of most of the compression-deflection tests reported on in the literature. Reasons for some of the deviations are now understood. At the time of the earlier work no unusual precautions were known to be needed as to surface conditions. The readings were usually taken on the first application of the load. Obviously the actual inherent stiffness of the rubber itself was not constant for all the samples in Figure 8. Note, however, that the upper and lower curves (extended from Figure 14) reasonably well denote the limits.

The data in Figures 6 and 7 have been repeated in Figures 10 and 11 with some additional tests and plotted in relation to the ratio of load area to free area. Data on hollow squares, rectangles, and a perforated slab are included.

It was thought advisable to check the results on squares and strips as reported by Hirshfeld and Piron. They showed that pieces in the proportions of 1 by 1 by 0.125 were approximately 50% stiffer than pieces of the same compound in proportions 1 by 10 by 0.227, both pieces having a shape factor of 2.00. They used compounds of 30 and 60 Shore durometer hardness. Our first trials checked this degree of difference closely, but we subsequently measured the inherent stiffness of the rubber by making petrolatum tests which virtually eliminate the effect of shape factors of this magnitude. This revealed considerably greater *inherent* stiffness in the small thin samples. When this was allowed for on the later tests, the small samples showed 25 and 29% stiffer, respectively, for compounds of 35 and 60 Shore durometer hardness stocks than the strips. We further checked this with new samples made from a single 1/8-inch sheet of each of the two stocks, laminating the cured stock to get 1/4-inch samples and we cut them 1.11 inches wide to restore the 2.00 factor. Figure 12 shows the results. It seems definite that the thin pieces are 25 to 30% stiffer when all experimental error is eliminated. In view of the many

other variables still inadequately controlled, and lacking a better shape factor, a discrepancy of this size in a relatively few cases should not deter us from the use of this factor.

Other Shape Factor Formulas

Brown in the paper previously referred to[3] proposed the use of the ratio of the sum of the two loaded faces to the entire surface of the piece as a shape factor. Brown's method is rather closely related to Keys' method, so closely that if the ratio of load to side areas is considered to have limitations, the Brown method has precisely the same limitations. Where x is one loaded area and y the total size area and S the shape factor for the ratio of load area to free area:

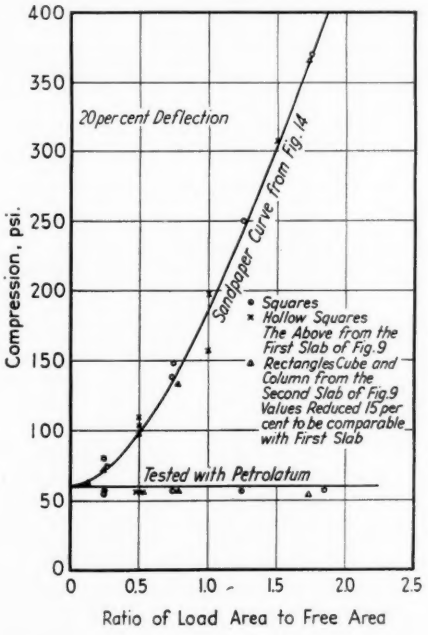

Fig. 10. Shape Factor Applied to Various Shapes of Compounds Having a Shore Durometer Hardness of 40. Data of Fig. 6 Are Included

$$\frac{x}{y} = S$$

Brown's formula similarly treated gives:

$$\text{shape factor} = \frac{2x}{2x+y} = \frac{S}{S+0.5}$$

Therefore, when two pieces have an identical shape factor by the one method, they also have identical shape factors by the other, and to whatever extent the Hirshfeld and Piron comment applies in the one case, it will be equally applicable in the other. For instance, any shape having a ratio of one load area to the free area equal to 2.00 will have a ratio of both loaded areas to the total area equal to 0.80. This is limited to pieces having parallel, flat loading faces, but neither rule is applicable to shapes outside of this restriction.

The loaded area over free area shape factor is somewhat easier to use and provides more accuracy for high shape factors where Brown's value approaches unity as a maximum.

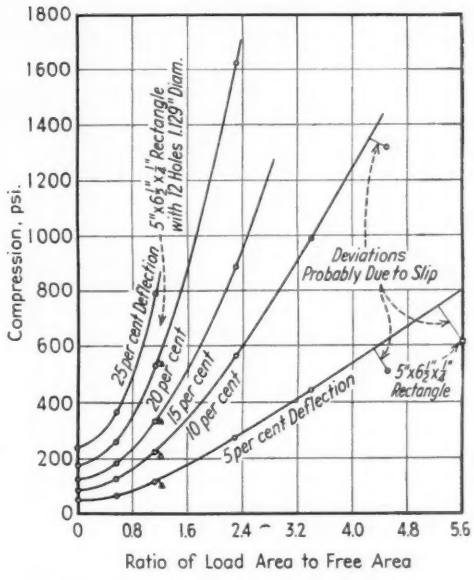

Fig. 11. Shape Factor Applied to Various Pieces Cut from One Slab Having a Shore Durometer Hardness of 65. Data of Fig. 5 and Fig. 7 Are Included. Samples Not Otherwise Indicated Are Cylinders

Shape Factor Charts

Figures 13 and 14 show in convenient form the data on compression deflection for various hardnesses and various shapes for 10 and 20% deflection, using the ratio of load area to free area as the shape factor. These figures are based on elimination of slipping at the loading faces. They will, therefore, apply to bonded pieces and to any unbonded pieces which can be protected from slipping.

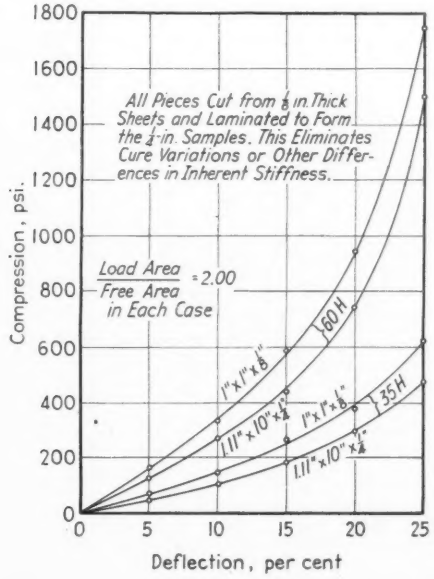

Fig. 12. Showing the Extent of Deviation in the Case of Relatively Long, Thin Strips

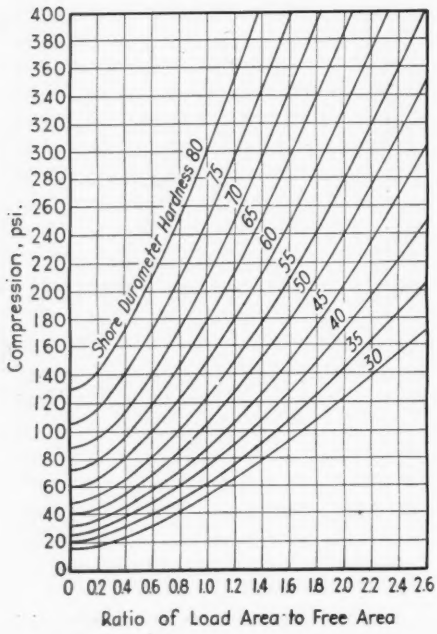

Fig. 13. Loads for 10% Deflection for Various Hardnesses and Shape Factors. Based on Elimination of Slipping at the Load Faces. Temperature 70 to 90° F.

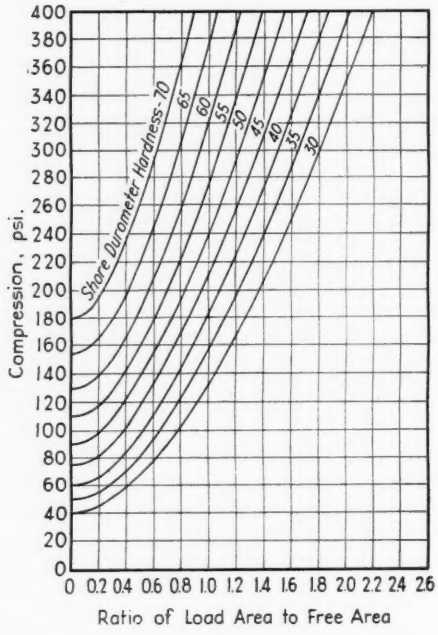

Fig. 14. Loads for 20% Deflection for Various Hardnesses and Shape Factors. Based on Elimination of Slipping at the Load Faces. Temperature 70 to 90° F.

Limitations

1. This shape factor is limited to pieces having parallel loading faces and sides normal to these faces.

2. Narrow, thin strips will be somewhat softer than shown by Figures 13 and 14, but all other shapes studied (within the limits of the previous paragraph) conform closely to these curves.

3. Obviously a compression piece must be kept within the limits of stability. Ordinarily a piece should not be thicker than its least width, but some cases where the percentage of compression is not high have been successful where the thickness is twice the least width.

4. Pieces with perforations must have the holes uniformly distributed over the whole area. If a piece with non-uniform perforation were required, it would be necessary to consider it as several pieces, calculating each one and assembling the data.

5. For large-shape factors the surface becomes increasingly important. Accidental lubrication in service may interfere with correct compression values. Bonding the rubber to metal plates is usually the best and often the only solution where large shape factors are needed. In this connection any slippage on the metal plates of pieces not bonded may result in abrasion of the rubber. Keeping the shape factor low is usually good practice, but shape factors below 0.25 may permit buckling. Therefore the usual practical range of shape factors as here defined is from 0.25 to 1.0.

6. We have assumed without experimental data, that with tapered or conical sections, the shape factor can be approximated by taking the ratio of the average of the two loading faces to the total free area. Cylinders loaded on their sides, spheres, rings loaded radially have not been checked. Irregular shapes, including those in which a progressively larger area contacts the loading plates and those to be used with curved or warped loading plates are usually solved only by trial and error. However, even in these cases, a rough approximation from these charts may be useful.

7. The individual tests were made with a good degree of precision, but when results are assembled in relation to durometer hardness, this degree of precision is not retained.

8. While for the above reasons it continues to be necessary to check results in actual use, the charts will be found satisfactory for preliminary designs.

With the forthcoming improvement in stiffness and hardness measurement technique, it should be possible to refine the accuracy of these charts. In any event it would seem that the method of presentation in this paper should be applicable to further work on the subject.

Faster Brass Plating Process

A new brass plating process, said to be two to four times as fast as present processes, is announced by the Electroplating Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The process makes possible smooth, bright, controllable deposits in less time than previous methods would permit. Also thicknesses of 0.001-inch or more are now obtainable in a reasonable time; whereas previously only very light-weight deposits were possible at the very low cathode densities available under former conditions.

The plating bath, quickly prepared from du Pont High Speed Brass Salts, will plate immediately, eliminating a "breaking in" period. Addition agents in the bath prevent pitting, improve lustre, and prevent objectionable fumes. The process operates at 105 to 125° F. and without polarization at high current densities, thus assuring proper composition and color of plate even on recessed objects.

The new process, described as one of the few significant changes which have occurred in brass plating practice in the last 20 years, is applicable to all brass plating operations.

Web Tension and Side Register Control for Slitting and Roll Winding Machines

H. E. Overacker[1]

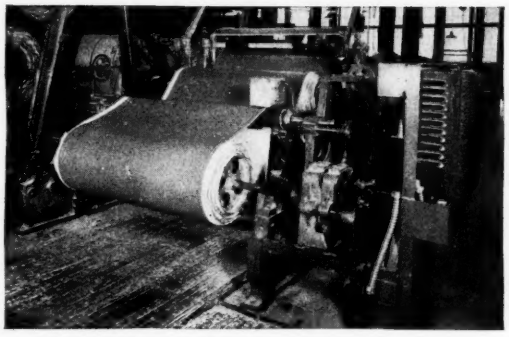

Fig. 1. Insulating Tape Slitter Equipped with Photo-Electric Side Register Control and Constant Tension

MECHANICAL web tension control and photo-electric side register control, both developments of the Cameron Machine Co., are two recent contributions to automatic and precision processing in rubber manufacture. The automatic web tension control was developed three years ago; while the side register feature was introduced in 1938. Both developments have been successfully applied to slitting and roll winding machines, and their use has spread to other web-fed equipment such as printing presses, calenders, and coaters.

The successful operation of the side register control depends upon proper web tension control, and it was not until after variable web tension was eliminated that side register control by photo-electric means became feasible.

Web Tension Control

Originally the goal with regard to automatic web tension control was the elimination of manual adjustment of the feed roll brake with variations in machine speed or roll diameter. The uniformity of web tension achieved also resulted in rewound rolls of even density from the core out, whether the material wound was rubber, fabric, paper, cloth-backed tape, or gauze.

The constant web tension control consists essentially of a floating counterweighted roll riding in a horizontal rack and connected through levers or levers and gears to the friction brake of the feed roll shaft. The amount of tension on the web is governed entirely by means of the counterweight which acts directly on the floating roll and which can be varied for any type of material. The brake is equipped with disk-type friction plates, with air cooling for speeds up to 600 feet per minute and with water cooling for speeds up to 3,000 feet per minute. In actual operation the control is extremely sensitive, and the roll does not float far in either direction except for an instant at the start and end of each run.

Side Register Control

As mentioned before, photo-electric side register control requires constant web tension control for proper operation. The use of both devices assures even tension together with accurate cross-wise register.

Essentially the photo-electric side register control comprises a scanning head, containing a light source from which light is projected in the form of a spot of light, as in one type, or several concentric circles of light as in another type. The scanning head contains, in addition to the light source, a photo-electric call which is sensitive to the amount of light reflected. The purpose, of course, is to keep the web running true with its edge at a constant lateral point underneath the photo-electric cell or "eye." When the web is running true, the edge of the web bisects the circle of light. What the "eye" sees, therefore, is a circle, half of which is bright (because of light reflected from the web) and half of which is dark (because of absorption of light by the dark rubber scanning roll over which the web passes). When the web is of dark material, a strip of light-colored paper is wrapped around the scanning roll directly under the scanning head and the position of the dark and light semi-circles of reflected light is reversed.

Suppose, for the purpose of following the operation of the electronic device, that an unevenly wound roll of material is being fed into a slitting machine. This unevenness causes the web to shift sidewise, which action in turn changes the proportion of the dark and light areas of the circle. Thus the amount of reflected light reaching the photo-electric cell is changed. As is well known, the resistance of the photo-electric cell varies with the intensity of the light absorbed. A change in resistance sets up a voltage differential in regulator tubes which are electrically connected to the photo-electric cell. The tubes in turn operate an auxiliary motor which, acting through a worm gear on the feed roll shaft, shifts the entire roll of material sidewise to compensate for any uneven wind-

[1] Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y.

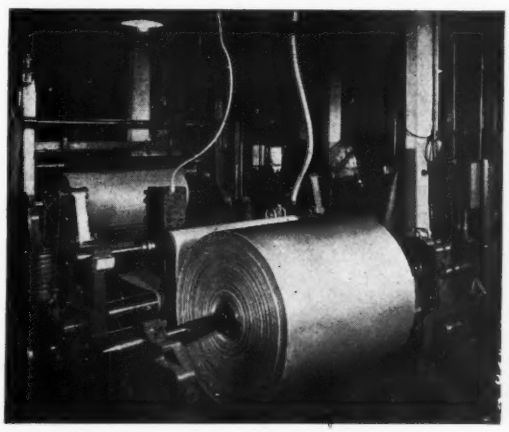

Fig. 2. Fast-Running Gummed Cambric Tape Slitter Equipped with Photo-Electric Side Register Control and Constant Tension

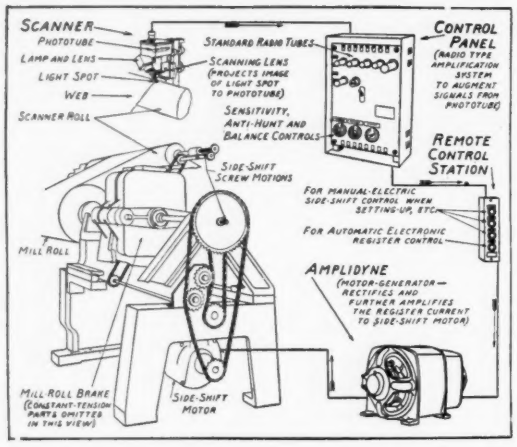

Fig. 3. Diagrammatic Sketch of Focusing-Lens Type Electronic Side Register Control as Fitted to Heavy-Duty Water-Cooled Constant Tension

ing of the original roll. In general, the control will make full correction at the rate of 25 inches of side traverse a minute.

The photo-electric cell operates on 60-cycle alternating current, providing 120 voltage or light impulses a second to correct off-register. The apparatus discussed above which throws a circle or concentric circles of light on the web, utilizes a fixed focus, rotary-lens type scanning head. The light passes through a circle of lenses in a motor-driven disk, the speed of which is synchronized with the light impulses directed at the lenses. Another type of apparatus utilizes a focusing-type scanner head which throws a small light spot on the web. This system requires a special motor-generator set for amplification in addition to amplifier tubes.

The photo-electric side register control is built in different types for use with slitting machines operating on gummed cambric tape at speeds in excess of 900 feet per minute, and for use on electrician's friction tape slitters, cloth calenders, coaters, waxers, and other roll-fed equipment which run at somewhat slower speeds. In the rubber and textile industries the main interest in side register control has been the avoidance of trim waste by taking unevenly wound rolls and winding them into rolls with smooth ends. When the material is being slit into narrow strips this may mean the saving of one or more coils.

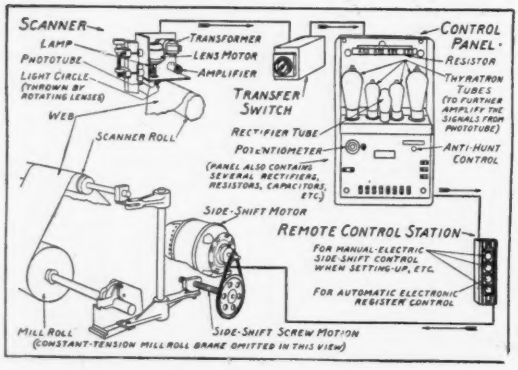

Fig. 4. Diagrammatic Sketch of Rotary-Lens Type Electronic Side Register Control as Fitted to Light-Duty Air-Cooled Constant Tension

Wickham a Smuggler?

THERE appears to be no doubt that Sir Henry A. Wickham was responsible for the collection and shipment from Brazil of the *Hevea* seeds which finally resulted in the establishment of the Far Eastern plantation industry. However two recent controversial statements have arisen as to the legality of Wickham's actions in shipping the seeds. The first statement, absolving Wickham as a smuggler, came from the Leather & Rubber Division of the United States Department of Commerce, which, in seeking information to aid the *National Geographic Magazine* in preparing an article ("Our Most Versatile Vegetable Product," by J. R. Hildebrand, February, 1940), wrote the American Commercial Attache, Rio de Janeiro, Brazil, for a report on Wickham's 1876 shipment of seeds from Brazil to England. The reply included a memorandum in Portuguese, dated June 7, 1939, from the Commercial Museum, Belem, entitled "Exportation of *Hevea* Rubber Seeds to the Far East," from the translation of which the following is quoted:

"Since, in the period of these experimentations, no one was thinking of the possibility of acclimating *Hevea* in other regions for the purpose of later competing with the rubber from the Amazon, no law existed prohibiting, in Brazil, the exportation of the seeds of this valuable plant, and likewise no one preserved here any reliable account of the circumstances connected therewith. This is the reason why when later it began to be understood that damage would result to the Amazon by the cultivation of *Hevea* in Malaya, a history of the exportation of the first seeds appeared in many different versions, getting further each time from the simple truth. In this way there grew up little by little a legend in which Sir Henry A. Wickham was pictured as a common adventurer who audaciously and surreptitiously stole seeds of the rubber tree, carrying them hidden in a fantasy ship after having lessened the zeal of the high officials of the customs of Belem (Para) by a banquet which he gave on board at the time of sailing. At least this is how it was published in the *Journal* of Belem on April 20, 1938, where the writer claimed to quote a certain Anton Zischka in his book 'The Secret War for Cotton.'

"The truth is that Henry A. Wickham transported the boxes of seed after dispatching them as he would any other merchandise. Inasmuch as there was no illegality in this—and the best proof of this is the fact that there were shipped in this same period many hundreds of young stalks of *Hevea* that there were no means of hiding when they were carried on board. Perhaps there might be a means of finding in the archives of the customs some record of these shipments.

"It was in relatively recent times that the exportation of the *Hevea* seeds was prohibited in the State of Para, and years afterwards in the State of Amazonas, a measure totally useless since none was adopted either in the State of Matto Grosso or in Bolivia where the richest rubber stands are found."

The above story which was presented in the *Planters' Bulletin* of the Rubber Research Institute of Malaya, July 1940, evoked the following statement from W. A. Wilken, M. C., J. P., of Merlimau Estate, Malacca, that appeared in the September, 1940, issue of the *Bulletin*, pages 8 and 9: "About 15 years ago, a company was formed to introduce to Malaya, an alternative crop to rubber. This product originated in Brazil, and was named Arghan. My company took up some shares, and experimental planting was arranged. The Arghan Company was supported by some of the big financiers in London, who obtained the services of Sir Henry Wickham, as their chief Planting

(*Continued on page* 55)

German Patents Relating to Synthetic Rubber-like Materials—VIII

Law Voge[1]

DRS. EVERS and Passer assigned to Siemans & Halske Co. an application for patent[2] on a "Process for the Improvement of the Properties of Synthetic Resins," in June, 1935. In this process the inventors use condensation products of diolefines with cyclic hydrocarbons as insulation material for high-frequency circuits. The claim reads: "Process for the improvement of the properties of synthetic resins prepared from diolefines in the presence of condensation agents with aromatic hydrocarbons which contain no side-chains having double valence, characterized in that these synthetic resins are heated some hours at 100-200° C. and dissolved in organic solvents, then subjected to electrophoresis by means of direct or alternating voltage, after which the solutions are filtered." As condensation agents are mentioned aluminum chloride, zinc chloride, iron chloride, boron fluoride, and boron chloride. No example is presented.

A "Process for the Preparation of Mixtures of Highly Polymerized Butadiene Hydrocarbons or Highly Polymerized Vinyl Compounds with Carbon Black" is the subject of patent application[3] in July, 1935, by Drs. Schneller and Spoun, who assigned it to the I.G. Farbenindustrie A.G. In this invention a mixed polymerizate of butadiene and acrylic nitrile can also be used, or a mixture of the straight and mixed butadiene polymerizates. Also ethyl acrylate polymerizate can replace the butadiene. The claim reads: "On working up these high polymers with carbon black obtained by deflagrating mixtures of gaseous unsaturated hydrocarbons with insufficient oxygen to cause complete combustion, in the presence of other diluent gases such as hydrogen, nitrogen, or carbon dioxide." *Example:* 100 parts by weight of sodium-butadiene polymerizate of high viscosity is combined on rubber mixing rolls with five parts by weight of stearic acid, 50 parts of carbon black, five parts of zinc oxide, 0.6-part of sulphur, and vulcanizing accelerator two parts. The carbon black is obtained by deflagrating a mixture of 46 parts by volume of acetylene, 12 of oxygen, and 42 parts of nitrogen, or of 20 parts of acetylene, 12 parts of oxygen, and 68 parts of nitrogen in a sealed pressure-proof vessel. The mixture can be used to form tubes or tire treads, etc. It is vulcanized by heating from 50 to 70 minutes at 135° C. The vulcanizate has a tensile strength of from 200 to 210 kilograms per square centimeter and an elongation of from 550 to 600%. It also possesses fine wear-resistance. In other examples acrylic nitrile- or styrol-butadiene mixtures are combined with the stearic acid, etc. Ethyl acrylate polymerizate is also so treated without butadiene.

In April, 1936, application for patent[4] was made by Dr. Kurt Billig and assigned to the I.G. on a "Plasticizer for High-Molecular Compounds." Through the action of carbonyl compounds on thiodiglycol, acetals are obtained. These are miscible with almost all high-molecular substances which are at all soluble. The claim of this patent reads: "Use of acetals of thiodiglycol as plasticizers for high-molecular compounds." The fourth example presented concerns synthetic rubber. In a highly viscous solution of 60 parts by weight of a mixed polymerizate of butadiene and vinyl methyl ketone, having been polymerized together in the ratio of four to one, 14 parts of acetal from thioglycol and cyclohexanone are kneaded in. The mass is then worked up on the rolls. This product can be well fabricated and formed and has age-durability.

A "Process of Preparation of Durable Compounds between Vulcanized and to-Be-Vulcanized Layers of Mixed Polymerizates of Butadiene and Acrylic Nitrile" forms the subject of patent application[5] by the Metzeler-Gummiwerke A.G. in September, 1936. No inventor's name is disclosed. The introduction of the patent states that it had not been possible previously to vulcanize durably mixtures of butadiene and acrylic nitrile polymerizate. The claim reads: "The vulcanized and roughened layer of the mixed polymerizate washed with a coal-tar oil fraction (boiling point over 160° C.) and covered with an unvulcanized mixed polymerizate mixture with the coal-tar oil fraction, and the layers vulcanized together in the press." This process is used for repairing inner tubes. No example is presented.

Dr. W. Sandhaas and associates assigned to the I.G. in January, 1937, an application for patent[6] on a "Process for the Preparation of Rubber-like Polymerization Products." The inventors state that it has been known that vinyl-ethinyl-carbinol can be polymerized and form, first, rubber-like elastic compounds, transformed by heat to hard, brittle products. These latter differ from the former in that they are insoluble in benzene, benzine, etc. Similar insoluble polymerized products can be produced, it has now been found, by polymerizing mixtures of the vinyl compounds mentioned above with butadiene hydrocarbons and their derivatives. The claim of the invention covers the production of rubber polymerized products by polymerizing mixtures of vinyl-ethinyl-carbonyls and butadiene hydrocarbons or their substitution products. *Example:* 75 parts by weight of butadiene, 25 parts by weight of vinyl-ethinyl-dimethyl-carbinol, and 1% to 2% of benzoyl peroxide are heated together under pressure to 70° to 100° C. After six or seven days there is produced a solid transparent rubber-like polymerizate which can be vulcanized as usual. Other examples use beta-chlor-butadiene. Instead of vinyl-ethinyl-dimethyl-carbinol, the cyclohexane or the dipropyl carbinol can be used.

A "Process for the Preparation of Rubber-like Polymerization Products of Butadiene or Its Substitution Products" is the title of an invention applied for in January, 1937, by Drs. Mueller-Cunradi and Daniel and assigned to the I. G.[7] The introduction states that from mixtures of butadiene with acrylic nitrile or styrol valuable rubber-like mixed polymerizates can be obtained, but on polymerizing butadiene with iso-butylene no polymerization occurs—at least non-homogeneous products are obtained though the individual components are polymerizable. This invention makes the polymerization of such mixtures possible. The claim covers the preparation of rubber-like polymerization products from butadiene or its derivatives by polymerizing these materials in the presence of highly polymerized dissolved iso-butylene. *Example:* ten parts by weight of polyiso-butylene (with a molecular weight of 50,000) are dissolved in a pressure-proof vessel

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[1] Research chemist and engineer, Washington, D. C.
[2] No. 673,392, granted Mar. 21, 1939.
[3] No. 674.581, Apr. 17, 1939.
[4] No. 676,136, May 26, 1939.
[5] No. 659,368, May 2, 1938.
[6] No. 673,128, Mar. 17, 1939.
[7] No. 677,433, June 26, 1939.

in a mixture of 68 parts of butadiene, 10 parts of cyclohexane. 1.36 parts of sodium are then added. After heating two days at 40° C. and washing and drying on the rolls, a polymerizate is obtained in practically 100% yield and containing 12.8% of polyiso-butylene. The vulcanization of this product is described. Another example uses beta-chlor-butadiene and benzoyl peroxide.

In May, 1937, application was made for patent[8] on a "Process for the Preparation of Rubbery Polymerizates from 2-chlor-butadiene, Non-Hardening on Storage" by Dr. Kiesskalt and associates and assigned to I.G. This invention is also protected by this patent in Austria. The inventors state that previously prepared products of this type always hardened in storage. The claims read: "(1) Through polymerization in aqueous suspension, optionally in the presence of accelerators, characterized in that the polymerization is undertaken at temperatures between 30°-40° C., causing the suspension to flow through a reaction vessel of small diameter and great length. (2) A process, according to claim (1) characterized in that simultaneously with a 2-chlor-butadiene, other polymerizable vinyl compounds are polymerized. (3) Process according to claims (1) and (2) characterized in that the flow of the suspension is so conducted that the polymerization is interrupted prematurely."

Example: 80 parts of 2-chlor-butadiene are suspended by introducing 2½ parts of sodium di-iso-butyl-naphthalene sulphonate and 1½ parts of sodium oleate in 120 parts by weight of water at 5° C. The emulsion is caused to flow through a tube of 10 millimeters inner diameter and 2,500 millimeters in length, maintained at 35° C. by a water bath. The velocity of the flow is so regulated that a passage-period of about 25 minutes obtains, whereby about 40% of the 2-chlor-butadiene introduced is polymerized. By distilling off, the monomerous non-polymerized 2-chlor-butadiene is recovered. The polymerizate is precipitated out and worked up further in known manner. These polymerizates maintain their elasticity in unvulcanized state on long storage.

Another patent application[9] was made in July, 1937, by Dr. Kiesskalt and associates and assigned to the I.G. on a "Process for the Preparation of Rubbery Polymerizates of 2-Chlor-Butadiene Not Hardening on Storage." This forms a supplement to patent 683,232. This is the most recently issued German patent on synthetic rubber yet received by the United States Patent Office:

"In patent 683,232 a process is protected for the preparation of rubbery polymerizates, non-hardening on storage, in which 2-chlor-butadiene becomes polymerized in aqueous suspension and wherein the polymerization is executed by causing the suspension to flow through a reaction-container of small diameter and much length at temperatures between 30 and 40° C.

"It has now been found that the polymerization can also be accomplished at temperatures of over 40° C. In this way with the same period of passage the yield can be increased, and for the same yield the period of passage can be lessened. For instance, the operation can be performed at 50 to 55° C. It is to be recommended, however, not to bring the temperature too close to the boiling point of the 2-chlor-butadiene because of the technical difficulties that will arise.

"*Example:* 72 parts of 2-chlor-butadiene and eight parts of vinyl methyl ketone are emulsified with the addition of 2.5 parts of sodium di-iso-butyl naphthalene sulphonate and 1.5 parts of sodium oleate in 120 parts by weight of water at 50° C. The emulsion obtained is passed at 50° C. through a tube of 10 millimeters inner diameter and 5,000 millimeters long. The velocity of flow is so fixed that a passage-period of about 30 minutes is had in which time about 45% of the initial monomerous product becomes transformed. From the resultant emulsion the non-transformed monomeride is distilled off in vacuum at about 30° C. The coagulate obtained in customary manner has a strength of some 270 kilograms per square centimeter and an elongation of some 600%. The advantage of the substance so obtained lies in the fact that it does not harden on storage in contact with air either in unmixed or in unvulcanized condition.

"Claim: Development of the process covered by patent 683,232 for the preparation of rubbery polymerizates of 2-chlor-butadiene non-hardenable on storage, characterized in that the polymerization is executed at temperatures above 40° C."

Drs. Gumlich and Dennstedt assigned to the I.G. in December, 1937, application for patent[10] on a "Process for the Emulsion-Polymerization of Butadiene or Its Derivatives." This invention is also protected by this patent in Austria. It concerns catalysts for the polymerization of butadiene and its derivatives with or without vinyl compounds in the presence of oxygen or of oxygen-yielding agents. The claim covers the use of complex organic compounds of such metals which can occur in several degrees of oxidation. As an example, 25 parts by weight of acrylic nitrile and 75 parts by weight of butadiene in the presence of 200 parts by weight of a 10% sodium oleate solution and 0.4-part by weight of benzoyl peroxide (as catalyst) are kept six days at 20° C. The yield is 16% of the theoretical. If the process is carried out in the presence of 0.1° part by weight of potassium ferriarabonate, the yield is 88%. The use of 0.12-part by weight of ferric-pyrogallate increases the yield from 5 to 100% and produces a very fine polymerizate product. Haemine, ammonium thiouramil persulphate, iron phthalocyanine sulphonate, and sodium iso-butyl naphthalene sulphonate are also used in other examples mentioned in this patent.

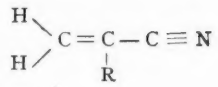
This concludes the survey of the German patents identified by the German patent office as Class 39b, Group 4.01: synthetic rubber—polymerizates of the diolefines such as butadiene and isoprene. There exists another large group of German patents, Class 39b, Group 4.02, of approximately the same size as the group just concluded. Group 4.02 is described by the German patent office as rubber-like plastic masses obtained through polymerization of other organic compounds with olefinic double linkage and includes such products as the polymers and copolymers of vinyl halides, styrene, isobutylene, acrylic acid, and acrylic acid esters.

Addenda

An important German synthetic rubber patent,[11] abstracted below, was not dealt with in the above survey because of its classification by the Germans in Group 4.02. This patent, applied for April 26, 1930, by E. Konrad and E. Tschunkur, is assigned to the I.G. and entitled "Process for the Preparation of Polymerization Products." Covering copolymers of butadiene with acrylonitrile (Perbunan), this patent is described as a supplement to a main patent (No. 654,989) on polymers of derivatives of acrylic acid or their homologs. It is probable that the supplementary patent has been included in Group 4.02 because the main patent definitely falls into that classification.

Patent No. 658,172 claims "that compounds of the general formula

[8] No. 683,232, Nov. 2, 1939.
[9] No. 687,387, Jan. 30, 1940.
[10] No. 679,587 Aug. 9, 1939.
[11] No. 658,172, Mar. 25, 1938. (This patent is referred to in connection with patent 684,936 discussed on page 39 of our November issue. Ed.)



in which R signifies hydrogen (acrylonitrile) or an alkyl group, are polymerized in emulsified form with butadiene, its homologs or analogs, or mixtures of these hydrocarbons and, optionally, the mixed polymerizates so obtainable are advantageously vulcanized after addition of highly dispersed filler." The products are said to take up fillers well and to yield vulcanizates, especially if mixed with carbon black, which are very strong and elastic and possess other valuable properties. No mention is made of solvent resistance and oil resistance.

The patent points out that previous proposals had been made to produce rubber-like mixed polymerizates of butadiene with compounds such as olefine benzenes, olefine naphthalenes, acrylic acid and its homologs, which contain conjugated double bonds. On the other hand, the nitriles used in the present process contain a double bond in conjugate position to a triple carbon-nitrogen bond. Furthermore the patent states that butadiene hydrocarbons had been previously polymerized using an addition of small amounts of acrylonitrile, but the amount of nitrile was so small that it acted solely as a reaction regulator.

In one example "25 parts by weight of acrylonitrile, 70 parts of butadiene, and 100 parts of a 3% aqueous solution of the hydrochloric acid salt of diethylaminoethoxyoleylanilide are emulsified together and polymerized by shaking for three days at 60° C. There is obtained in quantitative yield a latex-like mass from which there can be recovered by coagulation a tough, rubber-like polymerizate." Other examples specify: 50 parts butadiene or isoprene and 17 parts acrylonitrile; 25 parts butadiene and 25 parts acrylonitrile; 100 parts butadiene and 18 parts acrylonitrile; and 70 parts butadiene and 30 parts methacrylic nitrile.

Conservation of Rubber

(*Continued from page* 43)

other important products, such as footwear and garden hose. Such measures would have other effects than merely building up stocks of new rubber. They would cause an increase in our production of reclaimed rubber, preparing that industry for its logical position as the "first line of defense" in our rubber economy. They would stimulate the collection and reduce the wastage of scrap rubber goods, now often being used for fuel. Reducing imports of natural rubber by such a program would result in a worthwhile saving in foreign exchange.

Wickham a Smuggler?

(*Continued from page* 52)

Advisor, and later being on leave at the time, in course of business connected with this venture, I had the pleasure of meeting Wickham.

"On one occasion, I asked him what were the authentic details of his collection and transport of the original rubber seeds from Brazil. He told me that he had asked permission from the Brazil Government to collect the seeds, and no difficulties were put in his way, but at the last moment when he had his collection all ready for shipment, and even consignment papers completed, he was informed he would not be allowed to remove the collection, Sir Henry then went down to one of the ports and by great good luck, managed to get hold of a British tramp steamer that was about to sail for England. He then returned up river, put his collection of seeds in local boats or canoes, went down the river at night, put them on board the steamer, and handed his completed papers permitting export to the captain of the ship, and the seeds duly arrived at Kew.

"This is one version of the incident, and coming from Sir Henry himself, should be authentic."

Rubber Lubricant and Preservative

A rubber lubricant and preservative, containing colloidal graphite, is being marketed by the Alemite Division of Stewart-Warner Corp., for use on rubber shackles, mountings, grommets, etc. It is also said to deter the action of oil and gasoline on rubber.

Census of Manufactures

(*Continued from page* 44)

TABLE 2. (*Continued*)

	1939	1937
Mechanical goods not elsewhere classified, value	$32,180,151	$38,905,781
Rubber flooring (tile or sheet):		
Square feet	9,993,345	8,771,293
Value	$2,920,312	$2,664,597
Rubber mats and matting, value	$11,209,814	$10,624,592
Hard-rubber goods, except druggists' sundries:		
Battery jars, boxes, and parts, value	$11,682,830	$7,042,480
Combs, value	$2,353,759	$2,261,676
Mouthpieces for pipes and cigar and cigarette holders, value	$422,193	$401,103
All other, value	$5,959,332	$7,006,142
Rubber thread:		
Pounds	9,704,379	5,618,105
Value	$7,539,142	$3,475,477
Rubber cement:		
Gallons	19,605,464	15,447,489
Value	$10,055,115	$8,931,113
Rubber and rubberized gloves and mittens:		
Household:		
Dozen pairs	892,038	1,185,224
Value	$1,181,067	$2,172,950
Surgeons':		
Dozen pairs	851,581	
Value	$1,099,605	
Electricians':		
Dozen pairs	12,365	14,716
Value	$298,847	$275,862
Work gloves:		
Dozen pairs	228,833	175,427
Value	$603,054	$532,735
All other, value	$332,814	
Druggists' and medical sundries:		
Water bottles and fountain syringes:		
Dozens	682,824	640,554
Value	$3,031,179	$3,372,875
Nipples and pacifiers:		
Gross	423,709	517,281
Value	$1,384,264	$1,209,716
All other (including medical, dental, and surgical hard rubber), value	$7,037,325	$5,747,022
Stationers' rubber bands:		
Pounds	5,059,604	4,274,434
Value	$1,802,363	$1,749,292
Erasers, except pencil plugs:		
Pounds	2,031,996	1,679,373
Value	$1,015,998	$902,231
Sponge-rubber products not elsewhere classified, value	$11,125,789	$9,291,743
Camelback:		
Pounds	54,223,474	34,126,448
Value	$10,611,932	$7,229,895
Tire sundries and repair materials, value	$8,816,419	$8,899,832
Bathing caps:		
Dozens	958,269	789,504
Value	$1,423,853	$1,230,106
All other manufactures of rubber, value†	$52,927,903	$53,344,580

†Includes values as follows: for 1939—rubber clothing, $9,373,084; toy balloons, $2,125,628; and play balls and other rubber toys, $5,302,926. For 1937—rubber clothing, $11,054,705; toy balloons, $2,488,299; and play balls and other rubber toys, $4,777,832.

EDITORIALS

Highway Funds and Their Use

IN FORMER years it was a traditional and an accepted principle of public conscience that taxes collected by a government in the role of a proprietor should be used exclusively to pay the cost of the service for which the tax was intended. Besides violating tradition, the more recent practice of diverting the highway funds to make up deficits in general administrative funds has resulted in less construction and improvement of roads than would have resulted if the original purpose of taxes on gasoline had been strictly followed.

Indirectly tire manufacturers are affected by the diversion of revenue to other uses from the original purpose of building and maintaining good roads. Decreased funds, resulting in a lesser mileage of good roads, tend to retard the use of tires and foster greater tire hazards.

The American Petroleum Industries Committee has recently reported, "The average annual gasoline tax burden on motor vehicles has been doubled during the past decade. In 1930 annual gasoline taxes averaged $18 per vehicle. In 1940 the estimated gasoline tax burden will exceed $36 per vehicle. In eight states, in the southern part of the United States, this gasoline tax burden now averages in excess of $50 annually. In those states the high tax burden has tended generally to restrict automobile ownership and use."

In the 48 states "the levies on motor vehicle owners supplied 39% of the total tax revenue in 1939 (exclusive of social security premiums) . . . Gasoline tax receipts accounted for approximately 26%, or $816,433,000, an amount exceeding the total tax collections from all sources by the states less than two decades ago. Revenue from registration and other fees were 13%, or $412,497,000, of the total tax revenue of the states. . . . Although gasoline tax and motor vehicle registration fees increased nearly one-half billion dollars last year over similar revenues a decade ago, the amount spent for the maintenance and construction of state roads increased only $11,000,000, according to figures compiled from official government sources."

In connection with this last-stated condition it is of interest to note another statement by the Committee, which has studied the situation: "In 1929 all but 2% of the motorists' tax dollar was used for highway improvement purposes, while last year nearly 15% of the amount collected was diverted to the states' general funds."

A total of $181,654,000 has been estimated as the amount of last year's automotive tax funds that were diverted to non-highway purposes throughout the nation. More than two-thirds of the state legislatures are reported to have increasingly dipped into the highway funds.

Of particular significance in this direction is the approximately 3,000-mile defense highway program now designated by the War Department as important in giving access to military and naval establishments for which an outlay of approximately $194,000,000 is said to be immediately necessary. The amount of money diverted last year is only $12,346,000 less than the cost of this military necessity. The irony of the situation appears when we learn that John M. Carmody, Federal Works Administrator, has asked the American Automobile Association to throw its wholehearted support behind the effort to develop highway transportation facilities for national defense. This situation should emphasize the need of an immediate cessation of this trend and a resumption of the original practice of allocation to road building.

Recently some state legislatures have outlawed such diversion of funds, and there is a growing cognizance of this malpractice. It is and rightly should be meeting with strong public opposition. Future increase in tire usage is closely linked with the continued improvement and expansion of highways. In states where funds are being diverted, the opinion of individual residents, if expressed to the legislators, can influence such practices.

Industrial Training after Hours

IN THE preparedness movement and its accompanying increase in industrial activity, a shortage of certain types of skilled labor has already been manifested. Present conditions are indicative of a rapidly increasing need of training programs not only to rehabilitate those long divorced from industry, but also to promote versatility among those now skilled and employed. If in addition to supplying essential defense materials, we are to maintain the desirable production of normal peace-time requirements, many persons must be shifted to other work requiring an extended application of their previous skill, and others trained to step up into the vacated jobs.

To encourage employe training for the accomplishment of broader or higher skill the Wage and Hour Division, U. S. Department of Labor has announced that attendance at such training programs by employes would not be considered as working time requiring compensation by the employer, provided that such attendance met the four following criteria: attendance must be voluntary, and continued employment in his present job must not be dependent upon his attendance at the training program; the employe should not perform any productive work during the training periods; the course must be given outside of regular working hours; and the course must be intended to develop broader or additional skill, but not to make the employe more efficient at his present work.

This attitude of the Wage and Hour Division is indicative of a realization of the real need of training if production is to be expanded and an acknowledgment that the laborers are benefited by such a training program.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Rubber Division, A. C. S., Activities

Citrus Pectates for Creaming Latex Discussed at Los Angeles

WITH 57 members and guests present, the Los Angeles Group, Rubber Division, A. C. S., held its regular monthly meeting on November 4 in the Rainbow Room, Mayfair Hotel, Los Angeles, Calif.

C. W. Wilson, of the research department of the California Fruit Growers Exchange, spoke on "Citrus Pectates—Their Properties, Manufacture, and Uses." He explained how the various pectic substances, edible and non-edible, were extracted from the inner pulpy or waste portion of the citrus peels and how these substances were treated to form two types of pectins of identical chemical composition, but differing widely in solubility and fibrous structure. The speaker cited a patent which utilized the swelling and gelling action of pectin in the manufacture of sponge rubber. After pointing out that the normal supply of gums used in the creaming of latex was being rapidly depleted because of the war, Mr. Wilson stated that the use of 0.22% calcium pectate (a derivative of pectic acid) on the latex gave excellent creaming results. Using a Sharples cream separator for concentrating a latex so treated, a serum portion was obtained which contained about 3% rubber and nearly all of the calcium pectate. A second centrifuging removed nearly all the rubber from the serum, but the stability of this secondary cream was less than that of the first cream. Although tests indicated that pectates would act as anti-sticking agents for milled rubber, actual factory trials were unsatisfactory, according to the speaker.

The second feature on the program was a motion picture, "The Second World War," presented by Robert O'Neil. The film depicted various events leading up to the present war and scenes of the fighting in Poland, the shelling of Westerplatte, the bombing of Warsaw, the invasion of Norway and Denmark, and the fighting in Holland, Belgium, and France. The door prizes, three boxes of Delicious apples donated by C. M. Reinke, of Reinke, Hiller & Amende, Inc., went to J. W. Frasche (Goodrich), M. Montgomery (Martin, Hoyt & Milne), and P. A. Ritter (U. S. Rubber). The special prize, a portable radio donated by the R. T. Vanderbilt Co., through its representative, Vic Vodra, was won by Bill Haney (Kirkhill Rubber Co.).

A nominating committee consisting of E. L. Royal (H. M. Royal) as chairman, C. J. Roese (Goodyear), and Art Kroeger (Monsanto) was appointed to submit a list of officers to be voted on at the next meeting. Harold W. Rehfeld, of Goodrich, who is being transferred to the Akron, O., plant of the firm, was presented with a book personally autographed by all the members present at the meeting.

Trimble to Speak on Reclaim before Boston Group

GILBERT B. TRIMBLE, vice-president of the Midwest Rubber Reclaiming Co., will speak before the Boston Group, Rubber Division, A. C. S., when it meets on December 13, at the University Club, Boston, Mass. Mr. Trimble, who will present a paper on "Rubber Reborn" and the motion picture of the same name will deal with the early development of reclaim, recent developments in reclaimed rubber, and the possibilities of its use in the event of a national emergency. Preceding the presentation of the paper there will be election of officers for the coming year, and the group promises special features that will conform with the Christmas spirit of the occasion.

Buffalo Christmas Meeting to Be Held December 17

DECEMBER 17 is the date set for the Christmas meeting of the Buffalo Group, Rubber Division, A. C. S., to be held at the Hotel Lenox, Buffalo, N. Y. The technical portion of the program is scheduled for 5.30 p.m., when the Bakelite Corp. will present the sound movie, "The Fourth Kingdom," and a talk on "Plastics Up-To-Date." Dinner will be served at 6.30 p.m., followed by entertainment under the direction of Horace Taylor (brother of the well-known Colonel Stoopnagle), who will act as master of ceremonies.

N. Y. Christmas Meeting Scheduled for December 20

ELECTION of officers, distribution of gifts, and several novelty motion pictures, including two on the high-speed camera based on the work on the stroboscope of Professor Edgerton, Massachusetts Institute of Technology, are on the program for the annual Christmas party of the New York Group, Rubber Division, A. C. S., which will be held at the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y., on December 20. There will be no afternoon technical session, and the meeting scheduled for 6.30 p.m., will stress the holiday spirit. Tickets for the meeting, $2.50 for members and $5.00 for non-members, are obtainable from Peter P. Pinto, c/o *Rubber Age*, 250 W. 57th St., New York, N. Y. No new memberships for the year 1940 will be accepted after December 1.

Detroit Group Xmas Party Set for December 13

THE Christmas meeting of the Detroit Group, Rubber Division, A. C. S., to be held December 13, at the Hotel Detroit-Leland, Detroit, Mich., will feature: election of officers; entertainment by the Ford Mountaineers Orchestra; and a talk by Malcolm W. Bingay, better known as "Iffy the Dopester," columnist for the *Detroit Free Press*, whose subject will be "Where Do We Go From Here?"

Chicago Group to Combine Xmas Party and Ladies' Night

ON DECEMBER 20, the Chicago Group, Rubber Division, A. C. S., will hold its annual Ladies' Night, combined with a Christmas party, in the College Inn of the Hotel Sherman. As this affair, one of the highlights of the group's activities, has taxed the facilities of the hotel for several years, members are urged to make their reservations at once with the secretary, B. W. Lewis, c/o Wishnick-Tumpeer, Inc., 435 N. Michigan Ave., Chicago.

Chicago Chemical Show to Feature Industrial Conference

AN INDUSTRIAL CHEMICAL CONFERENCE on the newer developments in chemistry and chemical engineering will be featured as a part of the National Chemical Exposition to be held at the Stevens Hotel, Chicago, Ill., December 11 to 15 under the auspices of the Chicago Section of the American Chemical Society. At the Thursday forenoon conference meeting Per K. Frolich, director, chemical division, Esso Laboratories, Standard Oil Development Co., will speak on "New Developments in Synthetic Chemicals and Materials in the Rubber Industry." In addition to this meeting other sessions will be held Thursday evening, December 12; Friday forenoon and evening, December 13; and Saturday afternoon, December 14.

Suggested Nominations

THE name Per K. Frolich, of Standard Oil Development Co., Elizabeth, N. J., has been proposed as president-elect of the American Chemical Society for 1942. For councilors-at-large were proposed R. H. Gerke, research chemist with the United States Rubber Co. at Passaic, N. J., and Foster D. Snell, president of Foster D. Snell, Inc., consulting concern at 305 Washington St., Brooklyn, N. Y.

Johnson Discusses Synthetics before Chicago Section, A. C. S.

IN A talk before the Chicago Section, A. C. S., on October 25, C. R. Johnson, technical director, Wishnick-Tumpeer, Inc., discussed synthetic rubber—its history, economics, chemistry, and relation to crude rubber. In describing the various synthetic rubbers, Mr. Johnson classified these materials into six groups: (1) chloroprene polymers; (2) butadiene polymers (including copolymers); (3) organic polysulphides; (4) isobutene polymers; (5) plasticized vinyl chloride polymers; and (6) dimethylbutadiene polymers. Mr. Johnson will repeat this talk on December 9 before the Western Society of Engineers, at the Western Society Rooms, 205 W. Wacker Drive, Chicago, Ill.

Nichols Medalist

THE Williams H. Nichols Medal given annually by the New York Section of the American Chemical Society for "original research in chemistry" has been awarded Dr. Linus Pauling, head of the Division of Chemistry and Chemical Engineering of the California Institute of Technology, in recognition of his "distinguished and pioneer work on the application of quantum mechanics to chemistry and on the size and shape of chemical molecules." Presentation will be made at the New York Section dinner March 7.

Canadian Section Meets

ON NOVEMBER 12, the Rubber Section, Canadian Chemical Association, met at the University of Toronto, Toronto, Ont., to hear E. F. Reising, of the engineering department of the Firestone Tire & Rubber Co., Detroit, Mich., speak on "The Use of Rubber for Vibration Dampening." On December 19 I. E. Lightbown, of the Standard Oil Development Co., will discuss butyl rubber and will show the motion picture on this subject. In January the section will hear R. L. Sibley, director of research, Rubber Service Department, Monsanto Chemical Co., discourse on "Reactions of Rubber—Possible Commercial Uses."

Baking Lacquer for Molded Rubber Products

THE Stanley Chemical Co., East Berlin, Conn., has announced a new type of finishing material for rubber balls, rubber bulbs, hot water bottles, and other flexible molded rubber products. It is supplied as clear to produce high-gloss finishes on black or colored rubber stock, and it is also offered in any desired color in a pigmented formulation to produce opaque finishes.

The material requires baking for one-half hour at 260° F. to obtain maximum adhesion, flexibility, and durability. When baked in this manner, the coating is extremely dry and flexible and has a high resistance to alcohol. Rubber articles finished with this baking lacquer may be sterilized without effect upon the finish. The flexibility of the coating is unusual in that it will not crack at –10° F. The coating may be baked at a lower temperature for a longer period of time or for a shorter time at higher temperatures. However, while this will produce very interesting qualities, the result will not be the same as in the case of the baking schedule recommended.

The time and the temperature of baking need not affect the cure of rubber compounds unfavorably as is proved by present use of the lacquer in large production. Rubber compounds formulated for such baking operations can be produced. It may be desirable partially to cure molded products before applying the lacquer and to depend upon the baking of the finish to complete the cure.

Circo[1], a Plasticizer for Neoprene and Rubber

CIRCO LIGHT PROCESS OIL, a light golden colored material of a high degree of naphthenicity, is said to soften efficiently neoprene and natural rubber through physical changes in the basic structure, rather than by chemical changes. Thus, because the complex molecular structures of neoprene and natural rubber are able to absorb this oil, the remotest inner regions of these substances can be reached and permanently plasticized, it is claimed. In its function Circo Light Process Oil may be contrasted to those materials which, when absorbed, are held loosely within the rubber or neoprene structure and thus act primarily as lubricants. In certain cases it may be desirable, in obtaining optimum processing conditions, to add a small amount of a lubricant to Circo-compounded stocks.

With neoprene compounds, this oil may be utilized up to 50% by weight on the neoprene without blooming. To obtain unusually soft products, even greater quantities have been used, it is claimed. For complete absorption of the softener, the compound should be allowed to stand for a period of time (dependent upon the concentration of oil) before curing.

[1] This product was briefly mentioned on page 51 of our August issue.

Neoprene Type I Offers Higher Oil Resistance

NEOPRENE Type I is a modified chloroprene polymer which swells even less in oils than any other type of neoprene and suffers less degradation of physical properties upon immersion in oils, according to the maker, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The new type also stiffens less than other types when exposed to low temperatures. In addition Neoprene Type I possesses all the other special characteristics of neoprene—resistance to flame, sunlight deterioration, heat, and abrasion. The physical properties of Type I compounds are approximately the same as those of similarly loaded Type GN compounds except that Type I compounds are less resilient and more oil resistant.

The specific gravity of Neoprene Type I is 1.24. It is available in a semi-plasticized form and may be broken sufficiently for compounding by milling for about five minutes on a cool mill. The basic modifying or curing agents are the metallic oxides: zinc oxide, magnesia, and litharge; 10% zinc oxide plus 20% litharge on the weight of the neoprene is suggested for general purposes.

An indication of the swelling resistance of a Neoprene Type I compound as compared with a similar Type GN compound, is seen in the table that is given below.

	% Volume Increase after Immersion				
	Benzol at 82° F.		Kerosene at 212° F.	Water at 212° F.	
	One Day	Two Days	Seven Days	Two Days	Seven Days
Type GN	215	63.1	64.9	5.0	6.3
Type I	196	24.0	21.2	1.0	1.1

Both compounds were loaded with 37% channel black on the neoprene. The Type I compound utilized 10% zinc oxide plus 20% litharge for curing, while the Type GN compound used 5% zinc oxide plus 4% magnesia. This accounts to a large extent for the marked difference between the two compounds in regard to swelling in water.

Monsanto Rubber Chemicals

THE four chemicals briefly described below are accelerator and antioxidant products of the Rubber Service Department of the Monsanto Chemical Co. in Akron, O.

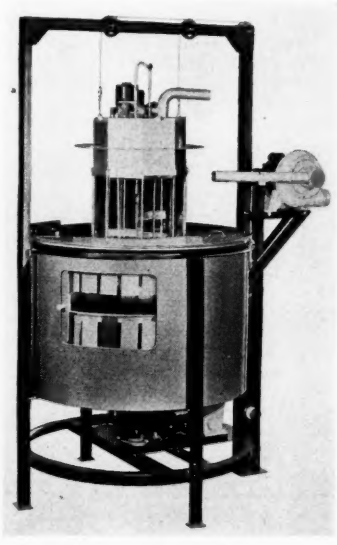
"A-100" is an aldehyde derivative of a Schiff's base made with the use of both butraldehyde and acetaldehyde. It is designed to produce short cures in hard rubber stocks for battery boxes, steering wheels, molded parts, etc.

"R-2 Crystals," an ultra-accelerator for curing liquid latex, cements, etc., is the reaction product of carbon bisulphide with methylene dipiperidine. It is emulsified readily and is soluble in the usual rubber solvents.

"R-23," also a latex accelerator, is the sodium salt of mercaptobenzothiazole dissolved in water. It is relatively slow in its action in latex, but when it is used in conjunction with "RN-2 Crystals," "R-2 Crystals" or "Pip-Pip," excellent cures are said to be obtained in a short time at low temperatures.

"Santovar A," developed as a non-discoloring antioxidant for white stocks, is an alkylated polyhydroxy phenol. It is also said to afford protection against sun checking in both cured and uncured compounds. The addition of a small amount of "Santovar A" to remilled scrap containing a plasticizer will, it is claimed, prevent the stock from becoming unduly soft.

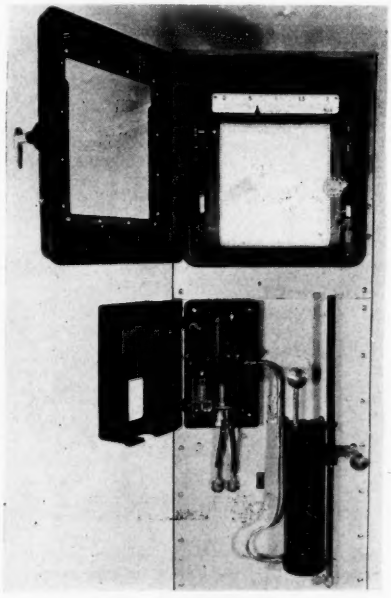
New Machines and Appliances



National Accelerated Weathering Unit

Accelerated Weathering Unit

THE National Accelerated Weathering Unit is designed for exposing test samples of rubber, rubber-like materials, plastics, protective and decorative coatings, etc., artificial sunlight or intense ultra-violet radiation under accurately controlled conditions. An aluminum framework, which will accommodate 64 samples up to 10½ inches in length, rotates about a 60-ampere carbon arc lamp, the source of radiation. The entire unit is enclosed in a copper tank. The test rack, driven by a ⅛ h.p. motor, makes one revolution about the arc in 118 minutes. The carbon arc lamp may be enclosed with special removable filter panels to limit the radiation essentially to wave lengths found in natural sunlight. When the filter panels are removed, the shorter wave lengths of ultra-violet are also utilized. Water spray nozzles are so located as to subject the samples to moisture during a portion of each revolution. National Carbon Co., Inc.



Cambridge Dissolved Oxygen Recorder

Dissolved Oxygen Recorder for Boiler Corrosion Control

THE Cambridge Dissolved Oxygen Recorder provides a continuous indication and record of dissolved oxygen in boiler feed water, with a sensitivity of one part in 400,000,000. It has a scale range of 0 to 1 part of dissolved oxygen per 1,000,000 parts of water and records full scale on a 10-inch chart. Readings of 0.003-part will scale 0.03-inch or nearly 1/32-inch on the chart. In operation the water, at a regulated temperature of 85° F. and with the flow controlled by a constant head device, passes to the analyzer unit which comprises a hydrogen generator (electrolytic cell) meter block and scrubbing tower where the hydrogen displaces the dissolved oxygen from the water. The resultant mixture of hydrogen and oxygen diffuses to the meter block.

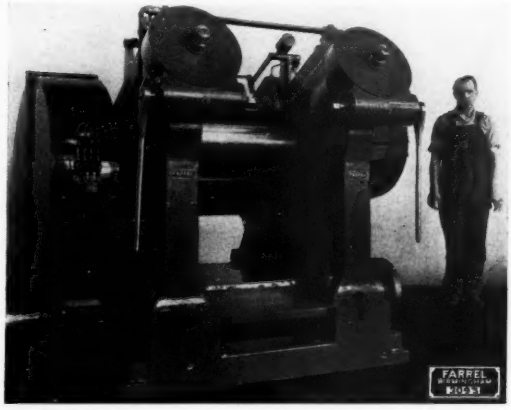
The metering unit consists of four platinum spirals, connected in the form of a Wheatstone bridge. Two of the spirals are exposed to the sample gas, and two are permanently sealed with saturated hydrogen. When the exposed spirals are surrounded by a mixture of hydrogen and oxygen, their temperature will increase because of the lower thermal conductivity of the mixture. The increased temperature of the spirals causes a change in resistance of the spirals with a consequent unbalance of the bridge circuit. The deflection of the recorder is, therefore, proportional to the concentration of dissolved oxygen in the sample water passing through the scrubbing tower. Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y.

Tilted Reclaim Refiner

THE new-type tilted refiner, illustrated here, operates with increased maximum roll speed and lower stock temperature simultaneously. With this new refiner reclaimers are finding it possible to finish refine a full, solid sheet at a drive roll speed of 60 r.p.m. or more, it is claimed.

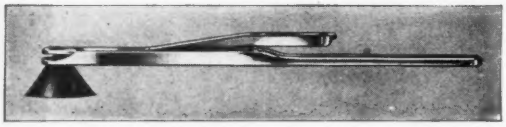
The two rolls are so arranged that the center of the hot or slow roll is above that of the cold or fast roll, which is also the larger of the two rolls. The combination of higher speed and lower temperature makes the larger roll responsible for stock feed to the bite of the rolls, as is also the case with the horizontal machine. The principal function of the hot roll is to offer resistance to the stock in the formation of the reclaim sheet to the top of the hot roll where it dries out and is out of contact with the feed roll. This results in improper feed, and with an insufficient amount of reclaim passing between the rolls, pressure is lost and dirt is carried through on the sheet instead of floating to the ends of the rolls.

With the hot roll above the cold roll, as in the case of the tilted refiner, the stock does not accumulate on the top of the hot roll, but is continually returned by gravity to the top of the cold feed (or lower) roll. This results in a constant rolling bank of stock on the feed roll, which condition minimizes drying of the stock, carries foreign matter to the ends of the rolls, and provides maximum feed at lower stock temperatures. Because by this arrangement the stock is fed continuously and uniformly to the bite, higher roll speeds and output are obtainable, it is claimed, with the additional production in proportion to the increase in roll speed. Farrel-Birmingham Co., Inc., Ansonia, Conn.



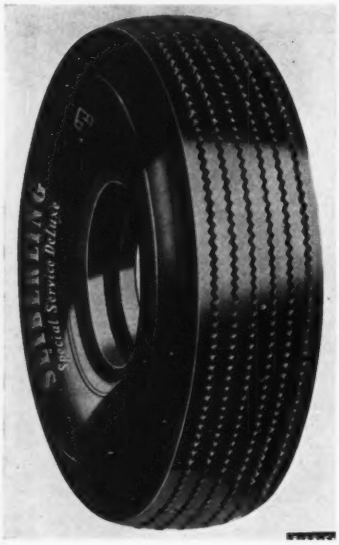
Farrel-Birmingham Tilted Reclaim Refiner

New Goods and Specialties



Safety Vacuum Lifter

Gann Resuscitator



Seiberling Saw Tooth Tire

This Doll with Latex Rubber Body and Molded Tenite Head as Made by Ideal Novelty & Toy Co., Is Said to Be Washable and Virtually Indestructible

Vacuum Lifter

THE IPCO safety vacuum lifter, comprising a duralumin handle and a resilient molded cup, is designed for lifting, feeding, and positioning sheet metal blanks in stamping machines and die-presses. Also, it is said to be applicable generally for lifting objects with a smooth, non-porous surface, but not weighing over 20 pounds. Industrial Products Co.

Vacuum-Cup-Type Resuscitator

THE Gann resuscitator, a recent contribution to life-saving technique as applied to drowning, gassing, or suffocation, consists of two rubber suction cups, three inches in diameter. Each cup has a handle, in the base of which is a ball valve. The cups are joined by an adjustable strip of Monel metal. At the base of each cup is an apron of flat rubber, two inches in width and covered by a ring of flat rubber to which is molded a rubber band 1½ inches wide, as a body strap. Emission of air to create a vacuum is obtained through the ball valves.

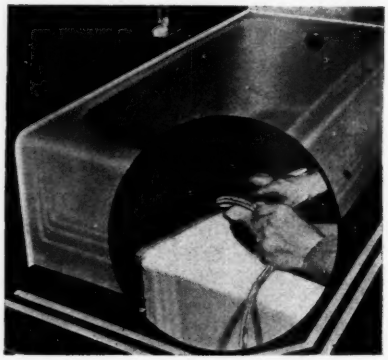
The resuscitator, which may be applied to the patient's back, chest, or abdomen, has no electrical connections or other accessories, is light and easily carried by hand, and may be operated easily by any person after reading brief accompanying instructions. Practical Products, Inc.

New Features in Seiberling Tire

THE Saw Tooth Special Service De Luxe Tire features a seven-rib tread with a saw tooth design, together with Affinite rubber compound, Saf-Flex Cord, and use of a vapor-cure process. Affinite is the term used to describe the tread rubber composition and is said to have high molecular density to give long wear. Saf-Flex cord is a tension-spun cotton cord of small gage with the fibers compactly locked together. This cord is 30% stronger than ordinary cord under extreme heat conditions, it is claimed. After being preformed in a mold, the tire is vulcanized slowly by a steam vapor process. The Seiberling Rubber Co.

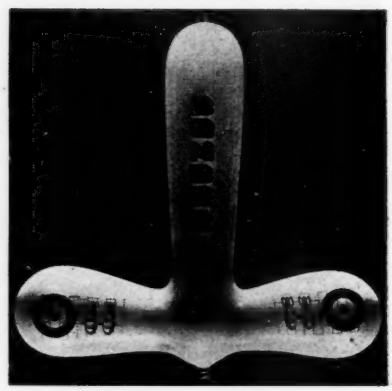
Bathtub Seal

A FILET strip of sponge rubber faced with solid soft rubber, known as Nairn Tub Moulding, provides a water-tight, decorative sealing joint between bathtub and bathroom wall or floor. The solid rubber outer surface is said to be impervious to soap and hot water; while the sponge rubber backing has a high distensibility that assures easy accommodation to expansion or contraction of the space sealed against leakage. The new material is carton-packed, with a 15-foot strip of molding, proper amount of adhesive for attachment, and an applicator brush for use with the adhesive. Congoleum-Nairn, Inc.



Application of Nairn Tub Moulding

Suprex Heel with Staggered Non-Skid Tread Made by Hood Rubber Co., Inc.



Oak Rubber Co.'s New Bomber Novelty Balloon Which Is Printed in Two Colors, Inflates to 22 Inches in Length, Has a Wing Spread of 20 Inches, and Is Provided with a Six-Inch Cardboard Propeller

UNITED STATES

Outlook Bright for '41

Industry continues at its accelerated pace, partly spurred by orders for national defense; and prospects for next year seem very favorable. One authority believes the 1941 record will average at least 10% better than that of 1940.

The following industries report the current year's volume to date has outstripped that of all of 1939: glass; electrical goods (set for an all-time high in 1940); automobiles and trailer coaches; construction; toys (expecting the best season in years); lumber; steel (also anticipating a record year); and machine tools (with a 1940 record output doubling that of 1939 and to be surpassed in 1941). The broom industry likewise finds the outlook good.

Last month steel output reached the high of 97%; and increases were also recorded in employment and in tin, paper, oil, lumber, and power output. But declines were noted in rayon weaving, the cotton mill rate, and carloadings.

Automobile production so far this year has exceeded the entire 1939 figure. Well-accepted cars are selling at retail in good volume, but the disinterested reception of less popular makes is proving a drag. Dealers' stocks are normal. Used car sales, however, have been unsatisfactory.

The rubber manufacturing industry is operating at the same high level of last month, and gains in employment are evident. Value of manufacturers' shipments recently rose sharply; while that of inventories advanced slightly. Tire replacement sales are up, especially for fourth-line brands, and this rate is expected to be maintained at least through the first quarter of 1941. The recent severe winter weather and storms in some sections of the country greatly stimulated sales of rubber footwear.

Rubber Industry Recorded Financial Gains for 1939

The Securities & Exchange Commission, Washington, D. C., in its "Survey of American Listed Corporations" recently released Supplement No. 14, "1939 Supplement for Tires and Other Rubber Products," covering financial operations of 14 corporations in the rubber industry with fiscal years ending between July 1, 1939, and June 30, 1940, which had securities registered under the Securities Exchange Act of 1934 at June 30, 1939. The report revealed that the combined volume of business for these concerns totaled 778 millions in the year ended on or about December 31, 1939, against 643 millions for the preceding year.

The combined operating profit was 62 millions, or 8% of sales, in the 1939 period, contrasted with 37 millions, or 5.8% of sales, in the year ended on or about December 31, 1938. These results were after combined charges for depreciation, depletion, etc., of 30 millions, or 3.9% of sales, in 1939, against 28 millions, or 4.4% of sales in '38. Thirteen firms reported operating profits and one an operating loss in the two years. The combined net profit for the 14 companies, after all charges including non-operating gains and losses, prior claims, interest, and income taxes, amounted to 40 millions, or 5.2% of sales, last year, compared with 23 millions, or 3.6% of sales, the year before.

In 1939, 17 million dollars were paid out as dividends to preferred stockholders and seven millions on common stock. The respective figures for 1938 were 10.5 and 4.3 millions. The combined total of all surplus accounts for the firms under review increased 18 millions to 141 millions for the fiscal year ended December 31, 1939; while a gain of 85 millions was made in 1938.

The combined balance sheet assets rose from 709 millions at the end of 1938 to 735 millions a year later. Cash and cash items increased from 72 to 74 millions; trade receivable from 108 to 122 millions; inventories, 201 to 216 millions; current assets, from 385 to 417 millions. Land, buildings, and equipment at their net book value were 295 millions, an increase of one million dollars; while reserves for land, buildings, and equipment advanced from 302 to 321 millions during the same period.

Current liabilities jumped from 63 to 87 millions. Stockholders' equity, as indicated by the total book value of capital stock and surplus, also increased from 429 to 449 millions.

The ratio of current assets to liabilities based on totals for all 14 enterprises was 4.77:1 at the close of 1939, against 6.16:1 at the end of the preceding fiscal year. Net sales per dollar of inventory (based on year-end balance sheet figures) or "turn-over of inventory" was 3.61:1 for the 1939 period and 3.20:1 for 1938. The return on invested capital (also based on year-end balance sheet figures) at book value for the 1939 date based on a total net profit before prior claims, interest, and income taxes was 9.58%, against 6.18%.

The 14 companies follow: Baldwin Rubber Co., Brown Rubber Co., Inc., Dayton Rubber Mfg. Co., Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., Hewitt Rubber Corp., I. B. Kleinert Rubber Co., Lee Rubber & Tire Corp., Norwalk Tire & Rubber Co., Pharis Tire & Rubber Co., Seiberling Rubber Co., United States Rubber Co. Two other rubber manufacturers also were registered with the Commission, but were not included in the report because of incomplete data.

Financial data for the fiscal years 1934-1938 for the above were previously issued as Report No. 9, Volume I, of the "Survey of American Listed Corporations," Works Projects Administration study sponsored by the Securities & Exchange Commission.

CALENDAR

Dec. 2-4.	American Institute of Chemical Engineers. 33rd Annual Meeting, New Orleans, La.
Dec. 2-5.	A.S.M.E. 61st Annual Meeting. Hotel Astor, New York.
Dec. 2-7.	14th National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York.
Dec. 6.	American Section, S.C.I., and New York Section, A.C.S. Joint meeting.
Dec. 11-15.	National Chemical Exposition. Sponsored by Chicago Section, A.C.S. Stevens Hotel.
Dec. 13.	Boston Rubber Group. University Club.
Dec. 13.	Detroit Rubber Group. Christmas Party. Detroit-Leland Hotel.
Dec. 17.	Buffalo Rubber Group. Christmas Meeting. Hotel Lenox.
Dec. 20.	Chicago Rubber Group. Christmas Party and Ladies' Night, Hotel Sherman.
Dec. 20.	New York Rubber Group. Christmas Party. Building Employers' Trade Assn.
Dec. 27-Jan. 2.	American Association for the Advancement of Science. Bellevue-Stratford Hotel, Philadelphia, Pa.
Dec. 30-Jan. 1.	Division of Physical and Inorganic Chemistry, A.C.S. Symposium on Structure of Molecules and Aggregates of Molecules. Columbia University, New York.
Jan. 6-10.	SAE Annual Meeting. Detroit.
Jan. 10.	Perkin Medal Award. Chemists' Club, New York.

Nypene Resin—A Softener

Nypene, a terpene polymer resin developed from turpentine, is said by its manufacturer, The Neville Co., Pittsburgh, Pa., to soften and plasticize rubber, to impart initial tack to latex, and to be compatible with the polybutenes and factice. Blended with 60% rubber, Nypene behaves as a pressure sensitive adhesive, suitable for most purposes except for rubber-to-rubber, it is claimed. The resin is also said to offer possibilities for alcohol-resistant coatings when used in conjunction with Pliolite. Other substances compatible with Nypene include natural and mineral waxes, certain oils, and alkyd resins, and it is said to offer good resistance to water, acids, and alkalies.

Nypene has a hydrogen-carbon ratio of 1.6-1.0, approximately the same as that of rubber, and has a mean molecular weight of about 1600. Other characteristics of the resin are: non-saponifiable; odorless when cold; pale in color; ring-and-ball softening point, 125 to 130° C.; specific gravity, 0.98; bromine number 95 to 100; permanently thermoplastic; and stable to heat.

EASTERN AND SOUTHERN

New Developments by the United States Rubber Co.

United States Rubber Co., 1230 Sixth Ave., New York, N. Y., recently patented a new coating for its original equipment white sidewall tires. It is a water-soluble lacquer applied to the sidewall immediately after the cleaning operation at the last stage of the production line and will be dry by the time it has reached finished goods storage on the conveyer. Prior to storing or shipping, a notice is stamped on the coating with instructions to remove the latter with an ordinary scrub brush and warm water. Thus new cars can reach dealers without the tire sidewall being marred by grease or dirt, and before display or delivery the car dealer has only to scrub off the protective coating which will not affect the white rubber in any way.

Self-Heating Aviator's Suit

President F. B. Davis, Jr., last month announced that by applying the recent laboratory-discovered knowledge that rubber, ordinarily an insulator, could be so compounded as to render it capable of transmitting electricity and throwing off heat in the process, the company has produced a self-heating aviator's suit. In tests made by the Air Corps of the United States Army on a test suit, the outstanding advantage over previous types of suit was that a proper heat equal to previous methods is delivered to the wearer's body with less weight, better fit, and the use of a superior scientific principle. On a subsequent test order, a considerable number of suits have been delivered to the Air Corps.

The new type of rubber sheeting, when electrically connected at the sheet ends, is a conductor of electricity, but at the same time it displays sufficient resistance to the current that a radiant heat is thrown off evenly by the entire surface of the sheet. The degree of heat radiated in any given area can be governed by the area of the radiating piece of rubber sheeting. The wearer, who is safe from the electrical current, can regulate the temperature derived from the suit.

Using this applied principle, U. S. Rubber made a suit, gloves, and boots for the use of pilots, gunners, navigators, and observers in operations where cold is a problem. Although at present such apparel is of major consideration for national defense, the principles involved should likewise be of value in peace-time air travel. Mr. Davis further stated that these principles also have a great number of possible immediate uses in normal life, which are in laboratory development stages and will be announced as they reach the commercial production point.

Change at Eau Claire Plant

U. S. Rubber has put Howard O. Hutchens in full charge of all operations at its Eau Claire, Wis., plant, and returned to his former duties with the main organization R. P. F. Liddell, who acted as temporary operations manager at Eau Claire when R. W. Hutchens first became ill.

1940 Power Show

The Fourteenth National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York, N. Y., from December 2 to 7, inclusive. This year's show will cover broadly the field of materials and apparatus used in the generation and distribution of power through the media of heat and electricity. Products to be shown will number about 1,200 and will include: combustion apparatus; boilers and heaters; refractories and insulation; piping, valves, etc.; steam plant apparatus, instruments; transmission apparatus; electrical apparatus; materials handling equipment; air conditioning and refrigeration apparatus; metals; power plant specialties; and machines and tools. During this same week the American Society of Mechanical Engineers will hold its annual meeting at the Hotel Astor in New York.

L. Albert & Son, dealer in rubber machinery, Trenton, N. J., reports a substantial increase in orders, with three shifts being employed in its plants at Trenton, Akron, O., and Los Angeles, Calif.

Triangle Conduit & Cable Co., Inc., Elmhurst, L. I., N. Y., has broken ground for a unit on a 23-acre tract at New Brunswick, N. J. The plant will have 200,000 feet of floor space.

Columbia Alkali Appointments

The Columbia Alkali Corp., 30 Rockefeller Plaza, New York, N. Y., a division of the Pittsburgh Plate Glass Co., Pittsburgh, Pa., through W. I. Galliher, director of sales, has announced that on November 6, Frank Waldo joined its technical service department as market research specialist. For 18 years he was a member of E. M. & F. Waldo, a firm importing and dealing in colors and pigments, and later became secretary-treasurer of Stevens Yarn Co. Mr. Waldo has long been very active in the New York Paint, Oil & Varnish Club and has also served as treasurer and executive committee member of the National Paint, Oil & Varnish Association.

Another announcement from the director of sales read that on November 18, James B. Gaskins also joined the company's technical service department. He has had a varied chemical business experience, mostly as sales representative for several concerns.

E. T. Asplundh, vice president, on November 8 stated that the deepest limestone mine in the world will be dug by Pittsburgh Plate Glass at Barberton, O., site of the company's Columbia Chemical division. The mine, reaching a depth of 2,200 feet, will supply the limestone for the company's local chemical operations, and some stone will be sold commercially. The mine is expected to be in full operation within two years and will employ about 100 men. Limestone is one of the principal raw materials used by Columbia in such products as soda ash, caustic soda, chlorine, and bicarbonate of soda.

Rubber Trade Association of New York, Inc., 95 Broad St., New York, N. Y., on November 14 held its annual meeting and elected the following directors: *dealers' group,* William T. Baird, Jr., A. Bendixsen, A. L. Grant, F. T. Koyle, J. Louis, and D. A. Paterson; *brokers' and agents' group,* Philip Billhardt, Louis V. Keeler, and Fred Pusinelli. The proposed amendment to the insurance clause of the Import Contract for U.S.A. was referred back to the board for further consideration. At the directors' meeting, which followed the annual meeting, Messrs. Grant and Keeler were unanimously reelected president and treasurer, respectively; while Mr. Paterson was unanimously elected vice president. B. G. Davy was reappointed secretary-manager of the Rubber Trade Association.

Views Taken at the First Regular Meeting of the Buffalo Group, Rubber Division, A. C. S., October 17 at Hotel Lenox, Buffalo, N. Y.

Supply Contracts Awarded

Recent listings of United States supply contracts awarded include:

NAVY: *batteries, storage,* Electric Storage Battery Co., Washington, D. C., $37,305, Willard Storage Battery Co., Cleveland, O., $52,146; *cable,* Anaconda Wire & Cable Co., New York, N. Y., $18,867, General Electric Co., Schenectady, N. Y., $66,551, Habirshaw Cable & Wire Division of Phelps Dodge Copper Products Corp., Yonkers, N. Y., $74,412; *hose,* Boston Woven Hose & Rubber Co., Cambridge, Mass., $60,036, B. F. Goodrich Co., Akron, O., $50,523, Goodyear Tire & Rubber Co., Akron, $85,346, Hamilton Rubber Mfg. Co., Trenton, N. J., $8,021, Mercer Rubber Co., Hamilton Square, N. J., $68,960, Pioneer Rubber Mills, San Francisco, Calif., $29,666, Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, O., $53,540.

WAR: *bags, canvas,* Chicago Rubber Clothing Co., Racine, Wis., $61,845, Marathon Rubber Products Co., Wausau, Wis., $56,100; *mattresses,* New York Rubber Corp., New York, $67,435; *overshoes,* Cambridge Rubber Co., Cambridge, $95,040, Converse Rubber Co., Malden, Mass., $164,800, Endicott Johnson Corp., Endicott, N. Y., $48,750, Goodyear Footwear Corp., Providence, R. I., $133,500, Goodyear Rubber Co., Middletown, Conn., $150,300, Hood Rubber Co., Inc., Watertown, Mass., $479,400, Servus Rubber Co., Rock Island, Ill., $157,080, Tyer Rubber Co., Andover, Mass., $84,200, United States Rubber Co., Naugatuck, Conn., $228,260; *tanks, self-sealing fuel,* Goodrich, $2,000,000; *tracks for scout cars,* Goodrich, $5,525,000.

Armstrong Tire & Rubber Co., manufacturer of automobile tires and tubes, Natchez, Miss., according to Factory Manager W. A. Moore is erecting a $250,000 addition to its plant. Excavation work has already been completed for a new warehouse which will be 200 by 200 feet with five floors, giving a total of 200,000 square feet of warehouse space. The building will be modern throughout, of concrete with a monolithic type of construction, equipped with elevators and conveyers for the handling of tires. The work should be completed in about two months. Mr. Moore also stated that the new addition will enable the plant to maintain a steady rate of production throughout the year and thereby eliminate seasonal lay-offs.

George H. Carnahan, president of Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., recently said that the guayule cultivation project undertaken in Italy with that government's backing and under a contract with Intercontinental Rubber, is expanding, and nursery seedlings for 3,000 acres of field plants have been made available for setting out between next January and April with plans completed to double each year the previous year's planting. It is understood that consideration is being given by the United States Government to the desirability of extended planting in this country.

Wants Industry Representation in Defense Program

The National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., at its fall convention held in Cleveland, O., October 27 to 29 unanimously approved a resolution requesting the Advisory Commission To The Council Of National Defense to create a separate section with group executive and assistant in charge of Waste Materials, the same type of action taken for virgin materials. The resolution, also approved unanimously by the Association's directorate, follows:

RESOLVED that the National Association of Waste Material Dealers, Inc., representing as it does, all branches of the Waste Material Industry, respectfully suggests to the Advisory Commission To The Council Of National Defense, that there be created a separate section with group executive and assistant, in charge of waste materials.

BE IT FURTHER RESOLVED that it is the unanimous feeling of members of this Association in Convention assembled, that the importance of secondary raw materials in the Defense Program amply justifies the creation of a separate section within the Advisory Commission To The Council Of National Defense rather than that the Industry function through the groups representing the virgin materials for which waste or secondary raw materials are substitutes.

BE IT FURTHER RESOLVED that in submitting this resolution to the Advisory Commission To The Council Of National Defense, we as an organization which rendered valuable service to the Government in the World War, pledge our cooperation to the limit of our ability in any direction looking towards an adequate defense for our country.

BE IT FURTHER RESOLVED that a copy of this resolution be sent to the Advisory Commission To The Council Of National Defense and to the President of the United States.

The United States Department of Agriculture, Washington, D. C., on October 30 announced that agricultural cooperation with the South and Central American republics will be furthered by a new division in the Department. This Division of Latin-American Agriculture is a part of the Office of Foreign Agricultural Relations and is under the general supervision of Assistant Director Earl N. Bressman. It will coordinate all phases of the program for encouraging production of crops that complement those of the United States, especially rubber. The new division also will work with private concerns interested in the production of complementary farm products in the Americas, and will provide statistical and other data on these products. Included in the professional personnel of the Division is Edgar R. Burkland, formerly connected with rubber surveys of the Department of Commerce.

Puritan Rubber Co., Trenton, N. J., is busy. General Manager James P. Flynn was on a business trip to Chicago and points west.

Synthetic Rubber Progress Traced

The main lobby of the Department of Commerce Bldg., Washington, D. C., features a series of exhibits illustrating the developments perfected by American manufacturers in producing greater quantities of synthetic rubber for national defense and industrial needs. Displayed are the various raw materials that go into the manufacture of synthetic rubber as well as sample products ranging from tiny gaskets to giant tires. Approximately 350 compounds of synthetic rubber for specific industrial wants have already been created.

Exhibitors include: E. I. du Pont de Nemours & Co., Inc., neoprene; Firestone Tire & Rubber Co., Buna under license; B. F. Goodrich Co., Ameripol; Standard Oil Co. of New Jersey, Butyl and Buna; and Thiokol Corp., "Thiokol." Lee Rubber & Tire Corp. is producing finished products of neoprene under a licensing arrangement with du Pont. Of course not all the developments exhibited are yet on the market in appreciable quantities, but they show the notable progress made in the last decade.

Trenton, N. J., rubber manufacturers continue to operate with increased working hours; while some have taken on additional help. Operating at capacity are Crescent Insulated Wire & Cable Co., Mercer Rubber Co., and Jos. Stokes Rubber Co., at both its Trenton and Canadian plants. Martindell Molding Co., having installed new machinery, is running 24 hours a day; and The Thermoid Co. is functioning with night shifts also. Thiokol Corp. announced a large increase in orders; while hard rubber production has also risen at Luzerne Rubber Co.

The estate of the late Jules Hauvette Michelin, general manager of the former Michelin Tire Co., Milltown, N. J., has been appraised by the New York State Transfer Tax Department at $944,433 gross value and $867,621 net. The assets consist chiefly of an $827,903 trust fund and real estate in New York of $25,000. The widow, Mrs. Simone H. Michelin, of Chamalieres, France, receives the residue in trust for life. Her two children, Annek and Pascal, will eventually receive it. Mr. Michelin closed the Milltown plant in 1930 after it had been in operation for 23 years. Before that he offered 700 employes $700,000 in bonuses. Mr. Michelin lived in New Brunswick, for 20 years, and later went to France.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., announces that its Condor Whipcord endless belts are now available from stock in a number of sizes and in two styles—capable of handling drives from ¼ to 25 h.p. and applicable to more than 1,500 different drives. The increase in stock sizes was undertaken because of the growing use of short, flat endless belts on short-center and pivoted-motor-base drives.

Columbia Broadcasting System, New York, N. Y., devoted its American School of the Air—"Americans at Work" program on November 25 (WABC, 9:15-9:45 a.m., E.S.T.) to rubber. Points covered in this dramatized dialogue arranged to acquaint the layman with rubber and its processing included Goodyear's early struggles with vulcanization, the functions of rubber processing machinery, and the early and recent conditions relating to rubber.

McCreery's, Fifth Avenue department store, New York, N. Y., in commemorating its 103rd anniversary recently, paid tribute to Charles Goodyear, who discovered vulcanization about the time the store was founded. One window contained early objects the inventor made of vulcanized rubber. A table, a chair, and a portrait were loaned by the United States Rubber Co., New York; and the other items came from Goodyear's descendants: his granddaughter, Mrs. Nelson Goodyear, her son Nelson, her daughter Evelyn, and seven-year old Charles Goodyear IV.

Brake Lining Manufacturers' Association, Inc., 370 Lexington Ave., New York, N. Y., on October 15 held its annual meeting at which the following officers were elected for the coming year: president, R. B. Davis, Raybestos-Manhattan, Inc.; first vice-president, T. L. Gatke, Gatke Corp.; second vice-president, P. B. Hoffman, American Brake Shoe & Foundry Co.; treasurer, J. S. Crawford, Johns-Manville Corp.; secretary, general manager, and assistant treasurer, C. A. Ekwall; executive committee, Messrs. Davis, Gatke, Hoffman, and Crawford, W. E. Harvey, of Thermoid Co., G. M. Williams, of Russell Mfg. Co.; M. M. Monroe, of Inland Division of General Motors; J. W. Crawford of Firestone Tire & Rubber Co., and F. I. Marshall, of Bendix Aviation Corp.

The Federal Trade Commission, Washington, D. C., has ordered six manufacturers of rubber typewriter erasers to cease and desist from uniform price fixing agreements. The Commission contends that from November 10, 1935, to April 10, 1938, the respondents maintained such an agreement, to suppress price competition, restrain interstate trade, eliminate competition among themselves, and monopolize trade in rubber typewriter erasers.

To Rule on "Identical" Bids

At the request of the United States Government, according to an order issued November 12, 1940, the Supreme Court has agreed to review the decision of the United States District Court for the Southern District of New York on March 5, which dismissed a civil suit filed February 20, 1939, by the Department of Justice against 18 tire manufacturers. The essence of the District Court decision was published on page 70 of our April issue.

Deresinated Gutta Percha Held Dutiable

The Treasury Department, Washington, D. C., has ruled in T. D. 50241 that deresinated gutta percha is no longer "crude" for tariff purposes and thus is subject to duty (effective November 1) under the classification of a non-enumerated manufactured article (paragraph 1558 of the Tariff Act of 1930). The record before the Department indicated that crude gutta percha is ordinarily imported in an underesinated form, since the presence of the natural resins prevents deterioration in transit, and that gutta percha is deresinated for the express purpose of producing a type of gutta percha suitable for making golf balls. The ruling was made despite an earlier decision, T. D. 48080, in which the United States Customs Court had held that gutta percha, which had been so processed that nearly all the resin naturally present had been removed, was entitled to entry free of duty.

Whitehead Bros. Rubber Co., Trenton, N. J., reported that business has picked up considerably in the past few weeks. Superintendent Wm. A. Howell has returned to his home after a long illness at a hospital.

Standard Oil Development Co., 26 Broadway, New York, N. Y., reports that its synthetic rubber plant at Baton Rouge, La., details of which were published in our May, 1940, issue, page 57, is expected to be in production by the end of January, 1941. This plant will produce the Perbunan type of synthetic rubber and not the widely-publicized butyl rubber developed by Standard.

MIDWEST

N. S. C. Rubber Section Officers

The National Safety Council, 20 N. Wacker Dr., Chicago, Ill., at its recent National Safety Congress in Chicago, held elections of officers for 1940-1941. The results for the Rubber Section follow: general chairman, Oliver Hopkins, United States Rubber Co., Providence, R. I.; vice chairman in charge of program, Ralph Farnum, U. S. Rubber, Detroit, Mich., secretary and engineering committee chairman, D. G. Welch, Hewitt Rubber Corp., Buffalo, N. Y., *News Letter* editor, John L. Grider, American Hard Rubber Co., Butler, N. J.; health committee, Dr. W. S. Ash (chairman), U. S. Rubber, Detroit, and Dr. J. Newton Shirley, Arrow Mutual Liability Insurance Co., Newton, Mass.; membership committee chairman, K. C. Loomis, Ohio Rubber Co., Willoughby, O.; publicity committee chairman, R. M. Weimer, Dayton Rubber Mfg. Co., Dayton, O.; statistics committee chairman, G. E. Teal, U. S. Rubber, Naugatuck, Conn.; members at large, E. W. Beck, U. S. Rubber, New York, R. A. Bullock, Corduroy Rubber Co., Grand Rapids, Mich., C. F. Horan, Hood Rubber Co., Watertown, Mass., J. J. Loge, General Tire & Rubber Co., Akron, O., J. E. Lovas, U. S. Rubber, Passaic, N. J., W. H. MacKay, Dunlop Tire & Rubber Corp., Buffalo, Urban L. Moler, Inland Division of General Motors Corp., Dayton, R. W. Morse, Firestone Tire & Rubber Co., Akron, William Spanton, American Hard Rubber, Akron, C. W. Ufford, Ohio Rubber, and Paul Van Cleef, Van Cleef Bros., Chicago.

The Association of American Battery Manufacturers, Inc., held its annual convention on October 24 and 25 at the Palmer House, Chicago, Ill., at which the retirement was reluctantly acceded to of L. B. F. Raycroft, of Electric Storage Battery Co., after five years as president of the Association. He was succeeded by the first vice-president, B. F. Morris, of Thomas A. Edison, Inc. Other officers elected follow: E. T. Foote, Globe-Union, Inc., first vice president; J. H. McDuffee, Electric Auto-Lite Co., second vice president; A. H. Daggett, National Battery Co., secretary; and L. A. Doughty, Carlile & Doughty, Inc., treasurer. Directors elected were A. J. Baracree, O. V. Badgley, H. C. Montgomery, Lester Perrine, Ward Perry, and Mr. Raycroft.

At the convention banquet the retiring president was presented with a sterling silver coffee service.

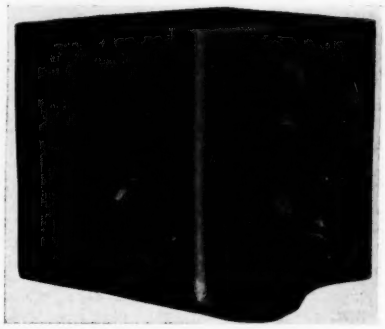
V. L. Smithers, of Akron, O., is commissioner of the Association.

W. J. McCortney, engineer in charge of the rubber plastic laboratory at Chrysler Corp., Detroit, Mich., on November 11 addressed the Detroit Section of the Society of Automotive Engineers on "The Economics of Substituting Synthetic Rubber in Automobiles," in which he reviewed developments in synthetic rubbers during the last decade.

Vinsol Resin—A Stiffener

Vinsol resin, a product of the Hercules Powder Co., Inc., Naval Stores Department, Wilmington, Del., is said to be a low-cost stiffener for rubber, which is resistant to oxidation, acids, and petroleum solvents. The resin, derived from the southern longleaf pine, is a hard, high-melting, dark-colored material, made in lump and pulverized form. An average analysis of current production of this material follows: melting point (drop method), 115° C.; acid number, 93; gasoline soluble matter, 12%; toluene insoluble, 20%. The electrical properties cited for Vinsol include: high break-down potential; good results on power factor and dielectric constant readings; and ability to withstand electrical impulses of high voltage (2,000,000 volts). Among other applications for the new resin are: paints and varnishes, asphalt emulsions, cement manufacture, plastics, and as a binder for fiber boards.

OHIO



Still Holding Gasoline Although Bullet-Riddled

Firestone Developments

The Firestone Tire & Rubber Co., Akron, has devised a static-free safety tire that grounds all electric charges and thereby eliminates the dangers of high-voltage discharges of static electricity from trucks, buses, and passenger cars. Some of these tires are already in actual service.

Actual construction of these new specially compounded tires is accomplished in several ways: static-free rubber appears in either the tread rubber, the sidewalls, or both. The first-mentioned application prevents generation of static charges by the rolling tire; the sidewall construction grounds static charges built up in the steel body frame and also grounds static electricity generated by the tires.

A similar static-free rubber compound is used by Firestone in tail wheel airplane tires to ground static charges picked up during flights.

Self-Sealing Plane Tanks

The accompanying photograph shows a self-sealing fuel tank for airplanes which, although well riddled with heavy machine gun bullets, retained its full capacity of gasoline in tests recently conducted upon these completed tanks by Firestone engineers. Tests have revealed that as many as 52 machine gun bullets have been fired through a tank without loss of contents. Firestone, cooperating in the national defense program, has developed self-sealing fuel tanks for use in armored motorized equipment and airplanes.

Willard Storage Battery Co., Cleveland, recently announced three executive changes. Harry E. Evans, for many years sales promotion manager and later assistant sales manager, has been made manager of the sales promotion, planning and market research department. Assistant Advertising Manager Howard C. Negus has been appointed advertising manager; and L. G. DeMotte has been transferred from the advertising department to the renewal sales department as assistant to the renewal sales manager.

Goodyear to Step up Chemigum Production 300%

Construction of a new, modern plant for the production of its synthetic rubber, Chemigum, was announced late last month by The Goodyear Tire & Rubber Co., Akron, O. Production will probably begin, in anticipation of defense needs, within six months' time as soon as equipment has been installed. The new plant, a combination one-and-two-story structure, is being located close to the company's factories in Akron and will employ about 75 men.

Goodyear currently has a small pilot plant which has been in operation for the past three years, producing experimentally. The new unit will step up the present output of Chemigum about 300%.

Rubber Treads for Tank Tracks

Contracts for manufacture of rubber track blocks for a large number of combat tanks for the national defense recently were awarded Goodyear by American Steel Foundry, American Car & Foundry, and the Rock Island Arsenal. The orders, which were issued on a subcontract basis and must be completed by about March 1, call for approximately 130,000 units, which will be vulcanized to metal plates and furnished with necessary bushings and accessories at Goodyear's mechanical goods plant in Akron.

Pliofilm Enters Food Packaging and Glove Fields

Pliofilm, under the name Mil-O-Seal, has been introduced into the meat packing industry by Milprint Inc., Milwaukee, Wis., according to an announcement by the Goodyear company, Pliofilm manufacturer. Mil-O-Seal is being used initially for packaging meat loaves, where it is said to have demonstrated its ability to reduce weight losses resulting from evaporation up to 10% and keep meat fresh for long periods.

Neostyle, Inc., Chicago, Ill., is making an open-end envelope of Goodyear's Pliofilm for packaging celery. Known as Pliofilm-Pak, the new container is said to have demonstrated its ability to keep celery fresh weeks longer than when unpackaged, in refrigerator temperatures of 35 to 40° F. and for several days longer on retail counters. After the celery is inserted in the envelope, a rubber band is stretched around the package just below the leaves of the celery which are not covered.

Josline, Inc., Hollywood, Calif., is manufacturing a glove made of Pliofilm, known as the Glamor Glove. It is said to protect the hands during such household tasks as cleaning and dusting furniture, polishing silverware, waxing floors, washing windows, and working with solvents. The palm of the glove is coated inside with a hand cream which serves as a beautifying aid.

Pliosheen—A Synthetic-Treated Fabric

Pliosheen fabrics, recently announced by Goodyear, are either silk or rayon, treated with a synthetic rubber substitute derived from limestone, coal, and salt. Among the claims for the new fabric are: it is waterproof, odorless, tasteless, flame-resistant, resistant to soiling, and easily cleaned with a damp cloth; it may be printed without technical difficulties and is produced in many colors—delicate pastels, deep tones, and deep white—all of which are sun-resistant. Field tests conducted for over a year's time have shown that Pliosheen is adaptable to use as raincoats, shower curtains, drapes, umbrellas, hospital sheeting, oxygen tents, infants' wear, etc. Distribution of Pliosheen will be made through Harte & Co., Inc., 267 Fifth Ave., New York, N. Y.

Spectrofoam—Colored Airfoam Slabs

Goodyear now offers its Airfoam, under the name of Spectrofoam, in the form of colored slabs 54 by 44 inches and in thicknesses ranging from ¼ to one inch. Colors are orchid, yellow, blue, peach, green, white, and pink. Spectrofoam, which is sold to converters who fabricate the articles, is currently being used for powder puffs, on shaving brushes, tooth brushes, mop heads, and other applications.

Plowing Champion on Goodyear Tires

Fred Timbers, of Stouffville, Ont., Canada, winner among 16 crack plowmen of the United States and Canada, who competed in the 1940 National Plowing Contest, near Davenport, Iowa, on October 29 under unfavorable weather conditions, piloted his Massey Harris tractor on Goodyear Sure Grip tractor tires to amass 92.95 out of a possible 100 points to win the title of American Plowing Champion. The winner of third place also had a Goodyear equipped tractor.

Goodrich News

J. J. Newman, vice president in charge of tire division sales of The B. F. Goodrich Co., Akron, last month announced the creation of a new sales district for the division, to embrace the Florida area, making a total of 26 districts in the tire division's nation-wide sales organization. The new district, formerly part of the Atlanta, Ga., sales area, will have its headquarters at Jacksonville. The district manager will be Conrad R. Helms, who has had 19 years' sales experience for the company in the South. He had joined Goodrich in 1919 as a wholesale salesman in the Charlotte, N. C., district. Then in 1927 he was transferred to Akron on special sales assignments and after two years became southeastern zone manager in charge of retail stores with headquarters in Atlanta. Since 1937, Mr. Helms has been general sales supervisor for Goodrich in the Florida area, with offices at Jacksonville.

Frank T. Tucker, director of advertising, last month announced the appointment of George F. Cozzens as advertising manager of the tire division, in charge of advertising on tires, bat-

teries, heaters, and other automotive products. In 1934, Mr. Cozzens came to Goodrich as sales promotion manager in the Washington, D. C., district and the next year was sent to Akron in the associated tire lines division. Then, in 1938 he was named advertising and sales promotion manager of the division.

Attendance at Goodrich Exhibit

Guy Gundaker, Jr., manager of the Goodrich building at the recent World's Fair in New York, reported that 5,335,912 persons visited the Goodrich Arena, as counted by the electric eye, constituting 22.6% of the Fair's total 1940 paid attendance of 19,115,269 visitors.

Rubber Tracks for Army Scout Cars

Goodrich, in announcing receipt of a $5,525,000 order from the United States Army, following one of $1,400,000 in July, for several thousand rubber tracks for use on high-speed "half track" scout cars, stated designs for this product were the result of experiments begun by Army officials in cooperation with Goodrich technicians in 1932. Further development and tests led to the perfecting of an inter-lock guide that improved the guiding of the rubber track, which consists of endless belts of resilient, elastic rubber blocks reenforced with embedded steel cables to give high mobility over all types of terrain. The tracks are mounted on the "crawler type" rear wheels of the scout cars, which attain speeds of 55 miles an hour and more. The rubber track is well suited to military vehicles because of its light weight, low power consumption, quiet operation, adaptability to high-speed operations, and use on improved streets and highways without damage to paving.

The tracks also have unusual commercial application, especially in agriculture, where the track's advantages, including durability and long life, are reflected in increased productivity and low cost.

New Batteries

An emergency starting battery for garages, motor fleet owners, and service stations engaged in road service, has been added to the Goodrich battery line. The new unit contains four cells and supplies eight volts in contrast to the three cells and six volts of the ordinary battery. Extra-long cables are available with the battery so that it can be used conveniently for starting the automobile motor without removing it from the service truck, or without installing it in the stalled vehicle.

Widened use of batteries built with glass mats and increased capacities of other units are features of the 1940 battery line recently announced by Goodrich. Included are the new Glasstex battery, GS-151; the F-2B51 for 1940 cars made by Ford; the HS-145 Standard; and the HD-145 heavy-duty regular. Truck batteries also have been improved, and the old types are replaced generally by Glasstex types built with glass mats and having two more plates per cell. Three of the new truck batteries are equipped with the patented Goodrich non-flood cell cover to prevent over-filling of the battery.

New Anti-Freeze

Goodrich, for the first time, is marketing through its automotive accessories division, an ethylene anti-freeze, known as "Stet," which is said to be of the permanent type, with one filling furnishing radiator protection in winter, if there are no leaks.

AMA Production Conference

"Maximum production under emergency conditions," was the theme of the Fall Production Conference of the American Management Association, held at the Hotel Cleveland, Cleveland, November 12 and 13. At the session on foremanship, A. C. Horrocks, of the Goodyear Tire & Rubber Co., Akron, and president, The National Association of Foremen, addressed the conference on "The Foreman Talks to the Production Executive," Mr. Horrocks, with a background of some 20 years with Goodyear, presented the "slant" of the foreman on the problems that so greatly affect his responsibilities in our production scheme.

Seiberling Announcements

The Seiberling Rubber Co., Akron, through Advertising Manager N. E. Malone has announced the appointment of Albert V. De Fosset to the advertising staff to succeed D. J. Brady, resigned. Mr. De Fosset will be in charge of Seiberling Dealer newspaper advertising, direct-by-mail campaigns, and the editing of the *Seiberling News;* he will oversee radio advertising and also create special campaigns and news bulletins.

President J. P. Seiberling last month announced the receipt of a contract for gas-mask face blanks for the Chemical Warfare Department of the United States Army. The order, totaling, $144,000, is one of a series the Seiberling company has received for similar parts.

J. L. Cochrun, Jr., Seiberling's South American representative, after a vacation in Akron left last month for his territory. This South American trip will last about six months.

Warwick Chemical Co., West Warwick, R. I., effective November 1, made Dale S. Chamberlin sales manager of the stearate division. Dr. Chamberlin, who has been vice president and chemical advisor of the company since 1935, holds degrees in chemistry and science from the University of Michigan, Lehigh University, and the Imperial College of Science and Technology of London. Besides having served as professor of chemical engineering at Lehigh, he has also had industrial chemical experience with Corn Products Refining Co., Lehigh Coke Co., National Oil Products Co., and R. K. Laros Silk Co.

CANADA

Hay on the Rubber Situation

Canada has shown foresight in accumulating rubber since the war started and has enough on hand to take care of the demand for several months. The Canadian Government has, however, just entered into an agreement with the International Rubber Regulation Committee which will assure a steady flow of this commodity to Canada, as long as there is no stoppage of trade routes across the Pacific.

Such is the opinion of Sir John Hay, member of the Regulation Committee who spent four months on this continent in surveying the rubber requirements of ordinary peace industry and the war industry of Canada and the United States. His mission here has been completed, and he returned last month to England.

Sir John declared that despite the fact that European markets have been cut off, except Britain, rubber production in the British and Netherlands East Indies will go on at 90% of potential capacity because of agreements entered into with the United States.

"In ordinary times the United States takes between 40% and 50% of all our rubber," he said. "Now, since the war has put extra demands on United States industry and at the same time has blocked off Continental Europe as a market, the United States takes a far larger proportion.

"There have been two agreements signed. In June and August, and it looks as if we will be able to supply all they want."

The Dominion Department of Munitions & Supply, Ottawa, Ont., recently awarded the following contracts: *clothing,* Dominion Rubber Co., Ltd., Ottawa, $84,000, Miner Rubber Co., Ltd., Granby, P. Q., $34,288, Northern Rubber Co., Guelph, Ont., $35,771; *hose,* Canadian Fire Hose Co., Ltd., Montreal, P. Q., $11,390; *personal equipment,* Dominion Rubber, $93,950, B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., $88,088; Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., $5,556.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., according to F. G. Reid, superintendent of engineering, recently made one permanent addition (7,566 square feet) and two temporary additions (13,715 square feet, total) to its plant at a cost of $175,000. The temporary additions were required to meet war necessities; while the permanent addition was made for storage and efficiency reasons in the mill and compound rooms, but no extra milling equipment was installed.

Viceroy Mfg. Co., Ltd., Toronto, Ont., expects to complete before Christmas the first unit of an extensive building program. Two floors will be devoted to a machine shop, and the top floor to the manufacture of rubber goods.

Viceroy was incorporated in 1930 to acquire Canadian I.T.S. Rubber Co., Ltd., organized in 1920. Head office is in Toronto, and the main plant, at West Toronto, covers 1¾ acres and has about 108,000 square feet of floor space. There are branches at Vancouver, B. C., Winnipeg, Man., and Montreal, P. Q. The company manufactures small rubber products, including heels, bands, erasers, water bottles, play balls, etc., under trade names of "Viceroy," "I.T.S.," and "Rubwood."

Gutta Percha Social & Athletic Club held its annual dance at the T. Eaton Co. auditorium, Toronto, Ont., November 8, attended by 650 persons.

James Davies, pioneer resident of Parkdale, Toronto, Ont., who died November 8 in his eighty-fifth year set something of a record in the rubber business. For 43 years he was a patternmaker with Gutta Percha & Rubber, Ltd., Toronto, from whose service he retired at the age of eighty.

OBITUARY

Sir Herbert Wright

AT HIS home in Chalfont St. Giles, Bucks, England, on October 28, died Sir Herbert Wright, chairman of Rubber Estate Agency, Ltd., and a director of Maclaren & Sons, Ltd., London, publisher of *India Rubber Journal*, of which he had been an editor. Besides having written several books and articles on rubber cultivation, Sir Herbert had also been on the boards, often as chairman, of more than 25 planting companies.

Sir Herbert was born in Lancashire in 1874. After completing his education at the Royal College of Science, London, he entered the rubber industry, doing research work at the Huxley Laboratory, London. In 1900 he went to Ceylon where he became scientific assistant to the director of the Royal Botanical Gardens, then controller of the Government Experimental Station, and later acting director of the Royal Botanical Gardens, making problems connected with rubber growing his specialty. He returned to England about 1907 and was editor of *India Rubber Journal* until 1917. From 1915 to 1938 he was also connected with the Imperial College of Science and Technology, first as representative of the Royal Commissions on Governing Body, and later as chairman of the executive committee and finance committee. It was in recognition of his services here that he was knighted in 1930.

In 1913 he was elected member of the Council of the Rubber Growers' Association and was its chairman in 1931, as well as a member of its various committees, and was representative of the Ceylon Division of the London Advisory Committee for Rubber Research, on the R.G.A. Netherlands Indies Committee, and on the Rubber Regulation Committee. He was also member of the Institution of the Rubber Industry, a Fellow of the Linnean Society, and an Honorary Fellow of the Imperial College of Science and Technology.

He leaves his wife, a son, and a daughter.

Funeral services were conducted on October 30.

Charles B. Seger

CHARLES BRUNSON SEGER, noted railroad executive who served as president of the United States Rubber Co., New York, N. Y., for several years, died at his country home near Lynchburg, Va., on November 11. Funeral services were conducted there November 13.

Mr. Seger was born in New Orleans, La., on August 29, 1867, and educated in the local public schools. He began the career which won him renown as an office boy with Morgan's Louisiana & Texas Railway & Steamship Co. His rise was rapid, and at one time he was on the boards of more than 40 corporations.

He became a director and a member of the executive committee of U. S. Rubber in March, 1917, was elected its president on December 5, 1918, and named chairman of the board in September, 1921. In 1919 he was also elected a director and president of Canadian Consolidated Rubber Co., Montreal, P. Q., Canada. He relinquished all these positions when he retired early in 1929. Besides Mr. Seger was a director and a second vice president of the Rubber Association of America in the Twenties.

The deceased belonged to the Academy of Political Science, the English-Speaking Union, the American Geographical Society, the National Economic League, the Institute of Social Science, and the New York Chamber of Commerce.

A daughter and a son survive.

L. Earl McKimm

WHILE on the way to work on October 22 the automobile of L. Earl McKimm, president and owner of the Metamora Rubber Works, Metamora, O., collided with a truck, and Mr. McKimm died before reaching the hospital. He began his rubber career in 1918 as a chemist at the Republic Rubber Co., Youngstown, O., and later served successively as president of the following concerns: E. L. M. Rubber Co., Racine, Wis., Mineral Rubber Products Co., Moline, Ill., Maumee Valley Rubber Co., Toledo, O., and The Carey Rubber Products Co., Carey, O. Then in 1937 he organized the Metamora concern.

Mr. McKimm was born in Maximo, O., on January 24, 1893. He attended Holy Cross school and Notre Dame University, from which he was graduated after majoring in chemical engineering. He also belonged to the Holy Name Society.

Requiem mass was celebrated at Gesu Church, Toledo, on October 26, with interment in Calvary Cemetery, Toledo.

The deceased is survived by his wife, a daughter, two sons, his mother, two sisters, and three brothers.

E. A. Grenquist

FOLLOWING a brief illness Ernst Alexander Grenquist, research chemical engineer at the Celluloid Corp., Newark, N. J., and for many years chemical engineer with the Fisk Rubber Co., Chicopee Falls, Mass., died October 12. He was born in Abo, Finland, on April 6, 1899, and educated at the Swedish Lyceum, University of Helsingfors, and University of Abo. After a brilliant war record the deceased obtained work in the chemical laboratory of the Ministry of Defense. In 1924, however, he migrated to the United States, becoming a citizen five years later. His first work in this country was in the medical field; then he joined Fisk in 1927.

Mr. Grenquist was a member of the American Chemical Society and the Institution of the Rubber Industry and also was the author of numerous papers relating to the rubber industry.

Funeral services were held on October 14 in Bloomfield, N. J., with burial in the local cemetery.

Survivors are the widow and a son.

Isaac Byer

ISAAC BYER, for many years in the scrap rubber business at Trenton, N. J., died November 12 at his home there after a lengthy illness. He is survived by his wife, two daughters, and eight sons. Burial was in People of Truth Cemetery, Trenton.

Allan A. Ryan

ALLAN A. RYAN, noted financier and head of Kaysam Corp. of America, Passaic, N. J., which he founded in 1936, died at a San Francisco hotel on November 26. The body was sent to Poughkeepsie, N. Y., where services were held last week.

Mr. Ryan was born on May 5, 1880, and educated at private schools and Georgetown University. Then began his spectacular career on Wall Street. He was also a director of many companies, including rubber.

He leaves his second wife, four sons, and two daughters.

FINANCIAL

Unless otherwise indicated, the results of operations of the following are after operating expenses, Federal income taxes, and other deductions. Additional tax charges under the new Revenue Act of 1940 have been made against earnings in

many reports. Figures in most cases are subject to audit and final adjustments.

American Cyanamid Co., New York, N. Y., and subsidiaries. First nine months of 1940: net income, $4,227,858, equal, after all charges and provision for preferred dividend requirements, to $1.61 a share on 2,618,364 common shares, against $3,261,358, or $1.25 a share on 2,618,369 shares, in the corresponding period last year.

American Zinc, Lead & Smelting Co., Columbus, O., and subsidiaries. September quarter: net profit, $153,864, equal, after dividend requirements on $5 and $6 preferred stocks, to 10¢ each on 673,088 shares of common stock, against $174,040, or 13¢ a common share, in the preceding quarter and $74,106, or $1.11 a share on 66,553 shares of $5 convertible prior preferred stock, in September quarter, 1939. Nine months to September 30: net profit, $407,504, equal to 22¢ a common share, against $160,260 or $2.41 a share on prior preferred stock last year. Year ended September 30: net profit, $566,877, equal to 33¢ a common share, against $182,860 or $2.75 a share on prior preferred stock for the preceding year.

Anaconda Wire & Cable Co., New York, N. Y. September quarter: preliminary net income, $420,586, equal to $1 each on 421,981 shares of capital stock outstanding, against $150,423, or 36¢ a share in the same quarter last year.

Baldwin Locomotive Works, Philadelphia, Pa., and subsidiaries. Year ended September 30: consolidated net income, $1,213,880, equal, after preferred dividend requirements, to $1.04 a common share, against net loss of $614,624 in the preceding 12 months; consolidated sales, $44,627,724, against $26,796,703.

Baldwin Rubber Co., Pontiac, Mich. September quarter: net profit, $81,475, equal to 26¢ a share on 315,754 shares of common stock, against $28,723, or 9¢ a share in the same quarter of 1939.

Barber Asphalt Corp., Barber, N. J. Nine months to September 30: net loss, $117,011, against net profit of $285,902, or 73¢ a share, on 390,223 shares last year. Year ended September 30: net profit, $141,538, equal to 36¢ a share, against $121,733, or 31¢ a share, for the 12 months ended September 30, 1939.

Belden Mfg. Co., Chicago, Ill. Nine months to September 30: net income, $265,714, against $228,964 in the 1939 period.

Boston Woven Hose & Rubber Co., Cambridge, Mass. Year ended August 31: net earnings, after charging $213,263.97 for depreciation and providing preferred dividends on 7,500 shares at $6 a share, $281,796.40, equal to $2.75 on 86,000 common shares outstanding, against $220,350.92, or $2.04 a share, in the preceding fiscal year; product sales, $6,701,945.21, an increase of $1,070,688.06 over the previous year; inventory, $1,681,474.86, against $1,358,109.54.

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiaries. Nine months ended September 30: net profit, after provision for federal income and excess profits taxes, $1,638,849, or $3.45 a common share, against $1,610,424, or $3.35 a share, in the same period of 1939.

Columbian Carbon Co., New York, N. Y., and subsidiaries. First nine months of 1940: net profit, $2,418,199, equal to $4.50 a share on 537,406 shares of common stock, against $2,380,330, or $4.43 a share, in the same period last year; deductions for depreciation and depletion $1,814,867, against $1,363,756; current assets, $9,021,903, including $5,207,659 in cash and marketable securities, and current liabilities, $1,299,564, against, respectively, $7,456,426, $3,905,409, and $864,033 in the 1939 period.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. September quarter: net earnings, after costs, expenses, and provision for depreciation and obsolescence, $25,840,172, against $17,784,175 in the 1939 quarter; net sales and other revenues, $91,797,317, against $75,737,170. First nine months of 1940: net earnings, $68,047,656, against $47,066,453 in the same period last year; net sales and other revenues, $254,815,899, against $212,122,639.

Electric Hose & Rubber Co., Wilmington, Del. Year to August 31: net income, $132,469, against $91,820 in the preceding fiscal year.

Flintkote Co., New York, N. Y., and subsidiaries. Fifty-two weeks to October 5: net income, after federal, state, and foreign, but not excise profits taxes, $1,472,629, or $2.17 a share, against $1,248,312, or $1.85 a share, in the corresponding period a year ago; net sales, $19,005,294, against $16,683,862.

Hewitt Rubber Corp., Buffalo, N. Y. September quarter: net earnings, after all charges and reserves for depreciation and federal taxes, $96,832, equal to 57¢ a share, against 38¢ in the June quarter. Nine months ended September 30: earnings, $199,203, or $1.18 a share, against $184,596, or $1.09 a share, in the first nine months of 1939.

United Carbon Co., Charleston, W. Va., and subsidiaries. Nine months to September 30: net profit, $1,078,707, equal to $2.71 each on 397,885 shares of no-par capital stock, against $1,107,715 or $2.78 a share last year.

(*Continued on page* 82)

FROM OUR COLUMNS

50 Years Ago—December, 1890

In no way has rubber been more beneficial to the human race than in the line of elastic bandages. (p. 64)

Coorongite is an India rubber-like material which was discovered many years ago near Salt Creek, which empties itself into the Coorong, a salt water inlet in South Australia. It was first observed on the surface, in little hollows in the sand, and resembled patches of dried leather. The theory formed was that this substance had resulted from the overflow of petroleum or rock oil. (p. 68)

The Institute of Technology during the last season tried a number of experiments with the milk-weed with a view of ascertaining how much caoutchouc is to be found in it. (p. 80)

U. S. Patent No. 435,995. Wheel tire for Cycles; John B. Dunlop, Belfast, Ireland. A hollow air inflated rubber wheel tire for cycles and other vehicles, in combination with an inner expansible tube, an outer protective covering, together with strengthening folds or layers of cloth, canvas or linen, and protective strips of rubber interposed bebetween the edges of the rim and strengthening the folds or layers. (p. xxiii)

25 Years Ago—December, 1915

From a normal and fairly satisfactory price level of 62¢, First Latex Crepe has suddenly risen to 83¢, and that without apparent cause. (p. 105)

The Rubber Covered Wire Engineers' Association was perhaps the oldest rubber club in the United States. It was started one year before the New England Rubber Club, and now comes into prominence by merging with the Associated Manufacturers of Electrical Supplies. (p. 106)

Over three years ago, Beadle and Stevens showed, for the first time, that the removal of the nitrogenous matter from Para rubber resulted in slow-curing rubber. In subsequent papers they have shown that the resinous matter also affects the quality and speed of vulcanization of the rubber. (p. 114)

The Pennsylvania Rubber Co. started as manufacturers of rubber goods in 1902. (p. 130)

A recent decision by District Judge Hazel of the United States Circuit Court of Appeals, of New York, declares that the A. H. Marks' patent on recovered rubber (the alkali patent) is valid. (p. 131)

The Clement Restein Co., Philadelphia, changed its name on September 28 to the Belmont Packing & Rubber Co. (p. 134)

Following a tire mileage investigation among Goodyear users, 1,000 tires were found that averaged a mileage of 9,974 miles. (p. 142)

LATIN AMERICA

BRAZIL

According to official figures, Brazil in 1939 imported rubber manufactures (excluding tires) totaling 453,460 kilos, value 14,941,193 milreis. The chief imports were: rubber thread, 48,474 kilos, value 1,138,532 milreis; rubber combined with fabric, 42,543 kilos, value 2,343,464 milreis; belting, 136,898 kilos, value 3,167,460 milreis; hose, 86,809 kilos, value 1,739,561 milreis; toys, 17,742 kilos, value 936,424 milreis; sporting goods, 11,377 kilos, value 553,278 milreis; unspecified rubber goods, 26,679 kilos, value 1,370,068 milreis.

The imports of automobile tires came to 4,012,311 kilos, value 50,245,972 milreis; automobile inner tubes, 213,942 kilos, value 3,312,470 milreis; and solid tires, 15,029 kilos, value 139,126 milreis.

The exports of crude rubber of all kinds totaled 11,804 tons. Automobile tire exports amounted to 17,008 kilos, value 214,642 milreis; inner tubes for automobiles, 2,025 kilos, value 36,451 milreis. Exports of other rubber goods totaled 8,781 kilos, value 246,021 milreis, more than half of which consisted of rubber footwear.

CUBA

Cuba is reported rapidly reaching a point of self-sufficiency in rubber heels. Locally made men's rubber heels of fair quality wholesaling at from 90¢ to $1.30 per dozen pairs have had little difficulty in replacing imported heels offered at about $1.44 net. Women's rubber heels of Cuban manufacture are said to be sold at 40¢ per dozen pairs against a reported price of 75¢ for similar imported articles.

Cuba is to have its first factory manufacturing automobile tires, it is reported. A Polish industrialist, who formerly operated rubber plants in Poland and Lithuania, is understood to be backing the enterprise, which will be located at Matanzas and will employ 500 workers. As the daily output is expected to be about 200 pneumatic casings and the average annual imports of these goods into Cuba have been around 80,000 units, the plan would provide for about two-thirds of the island's annual requirements.

PERU

The manufacture of rubber goods in Peru is still on a very limited scale. Only three small firms are engaged in the business: a Japanese firm, Kawai y Hno, which makes rubber heels, bands, printing rollers, small hose for tire pumps, toys, etc.; Roland & Co., rubber-soled shoes, bedroom and bathing slippers, bath mats, and toys; and Cia. Industrial Caouchifera, S.A., organized in November, 1939, to manufacture rubber-soled shoes and rubber gloves. The total imports of crude and reclaimed rubber have been declining; they were 36 long tons in 1937, 34 in 1938, and 29 in 1939. Still it seems that local manufacturers prefer the imported rubber to Peruvian rubber because the latter contains a high degree of moisture and also costs more owing to the expense of bringing it from the Trans-Andean region where it mainly grows. The rubber must be brought from Iquitos to Callao, which trip takes 40 to 50 days; while the freight costs approximately $12.50 per metric ton.

It has frequently been proposed in the Chamber of Senators to study the possibilities of establishing a tire factory at Callao, and an American manufacturer has also considered the plan, but so far there seems little chance for its success, and there is little possibility that anything will be done in this direction for some time to come.

MEXICO

During the first five months of 1940, Mexico imported 1,435 long tons of crude rubber, 11.5% under the figure for the same period last year. In 1939 imports totaled 5,101 long tons.

Mexico imported 261,940 kilos of pneumatic tires in 1939, of which the United States supplied 228,270 kilos; Canada, 25,629 kilos; Italy, 4,365 kilos; Germany, 2,261 kilos; Great Britain, 708 kilos, and France, 707 kilos. It is expected that total imports for 1940 will equal those of 1939.

EUROPE

GREAT BRITAIN

Old Tires to Be Salvaged

The Voluntary Control Panel of the Rubber Industry has now taken up the matter of salvaging old tires to economize on raw materials that must be imported and to release valuable shipping space. It has requested the cooperation of tire manufacturers in a plan whereby all users of pneumatic tires will be invited, as a war measure, to return their old tires to the original manufacturer through the dealer from whom they usually buy. At the request of the customer, tires in a suitable condition will be reconstructed in the original molds from which the new tires were produced. A moderate price will be charged for this service.

Growing Popularity of Crepe Soles

No doubt as a result of the war, rubber soles for all types of footwear are very much in demand in Scotland at present and are expected to gain in favor as the winter progresses. Not only overboots and shelters boots are provided with thick soles of crepe, red rubber, or composition, but also fashion footwear for women, with crepe soles by far the most popular. One firm is featuring crepe soles one inch thick with wedge heels on their stylish models, and gay colors are much used. These shoes are very comfortable and are therefore great favorites with women, it is said.

New Twin Inner Tube

A new twin inner tube adaptable for wheels of all kinds of vehicles has been devised by J. Clayton, a railway employe of Blackburn, Lancashire. The invention consists of a reserve inner tube housed within the main inner tube and fitted with a separate valve passing through the main tube. The reserve inner tube, slightly smaller than the main tube, is made of somewhat thinner rubber. When the main tube is inflated, the secondary tube clings to the inside rim and is compact and deflated. In case of puncture the spare tube is pumped up after the nail or other offending object has been removed from the tire. The spare tube is designed for emergency only. The inventor has as yet made no arrangements for marketing his new device, but is satisfied, after testing it for six months, that it will prove valuable to automobilists and cyclists alike.

Notes

Sir Walrond Sinclair, a member of the British Government Commission formed to investigate market possibilities in South America, is understood to be on his way to those parts.

Following the death of W. F. V. Cox last August, Miss C. Carden has been appointed secretary to the Institution of the Rubber Industry, and at the same time of the Rubber Industry Export Group and the Voluntary Control Panel. Miss

Carden has been associated with the I. R. I. from its earliest days, when it was still known as the Rubber Club of Great Britain.

Dr. H. J. Stern and W. H. Stevens have moved their offices from 75 Chancery Lane to 214 Great Portland St., London W.1.

According to a Control of Plastics Order issued by the Minister of Supply and effective October 1, 1940, the use, purchase, or sale of certain plastics in the form of molding powders is not permissible without special license. The controlled plastics are those in the production of which any of the following materials have been used: formaldehyde, phenol, cresol, urea, thio-urea, and cellulose-acetate.

GERMANY

Conference on Synthetics

The Sub-Committee C 1, representing the synthetics group of the German Chemical Society, held a conference in Berlin on June 21, at which results were reported of work undertaken during the past year to find new ways and forms of substituting synthetics and plastics in various industries. Among the reports were: "Tension Phenomena in Plasticized Igelites," by H. Hofmeier; "Investigations of Softeners for Igelites," W. Schroeder; "Manufacture, Properties, and Application of Polyvinylacetals," A. Weihe; "A Laboratory Method of Determining the Thermal Degradation of Buna S and SS," W. Esch; "Substitution Possibilities and Properties of 'Thiokol' Mixes," G. Kallner; "Classification, Nomenclature, and Trade Names of Synthetics," G. Matulat; and "Designation and Classification of Organic Synthetics," H. Hofmeier.

"Materials and Chemistry"

Under the above name a congress and an exhibition were held in Breslau from July 30 to August 4 by the Dechema, German Society for Chemical Plant. The exhibition, at which about 80 German firms were represented, amply demonstrated the great strides made also in the German synthetics and plastics industry in the last few years and the extent to which it has been possible to replace with domestic materials those that have to be imported. Here Buna, "Thiokol," and the polyvinyl products are of prime interest.

A variety of articles made from gutta-syn, vinidur, and PeCe fiber was shown. Gutta-Syn, a vinylpolymerizate produced by Rost & Co., is available in both hard and soft forms. Goods of this material included hose for various purposes, among others welding hose with fabric inserts, said to withstand internal pressure of 84 at. In addition were Gutta-Syn buckets for explosives, flasks which resist 75% hydrofluoric acid, stoppers, acid-resistant linings, protective garments. The Vinidur products comprised different kinds of tubing, filters, linings for all kinds of containers, a small acid centrifugal pump, etc.

Of special interest is the new PeCe fiber made by the I. G. Farbenindustrie A.G. At the exhibition it was shown in the form of filters for chemicals. PeCe fibers and threads are produced from polyvinylchloride which has been rechlorinated so as to contain about 63% chlorine. This material is converted into a viscous mass and spun into threads and fibers according to the methods usual in the artificial silk industry. The PeCe threads or fibers so produced are outwardly not to be distinguished from any other artificial silk or wool and are available in sizes customary for artificial silk, however the usual size of PeCe thread is 3¾ deniers. It is said to have exceptional resistance to chemicals, will not rot, and has good heat and electrical insulation properties so that it is being used for technical purposes, filters for strong chemicals, protective garments for workers in the chemical industry, in the fishing industry (nets, cords, ropes, etc.) for packing, and for belting.

Hard and soft Buna were also shown in different applications, including rolls for paper and textile machines, and buckets consisting of two layers of synthetic rubber with per-

forated tin plate between, proper union being achieved at the perforations.

Among the "Thiokol" products were packing, gloves, tubing, fuel tank linings, and an aluminum cable with "Thiokol" insulated conductors and cover.

A new material, Iporka, was shown for heat and sound insulation. Not much seems to be known about it except that it is exceptionally light, one cubic meter weighing only 15 kilograms; whereas the same amount of foam rubber weighs 50 kilograms, and cork, 250 to 350 kilograms.

The wide range of testing apparatus on view, included a plastograph with which plasticity, toughness, and consistency of plastic masses, including rubber, can be measured; a device for the dynamic testing of rubber, both natural and synthetic, and another to test porosity of linings, etc.

ITALY

The Twenty-first Milan Sample Fair was held from April 12 to 28 and under the present circumstances was considered a great success. There were 5,450 exhibitors, of whom 1,300 were foreign, mostly German.

Italy's efforts at self-sufficiency are represented by a growing plastics and synthetics industry which took its proper place at the Fair. This industry now includes about 200 factories, of which the majority are small; 50 are medium scale, and 10 are large. They employ altogether about 4,000 persons and, according to the plan for 1940-41, will have a total output of 23,000 tons. This plan does not as yet cover the synthetic rubber industry. The products will consist of phenols, aminoplasts, cellulose derivatives, vinyl and acryl resins, all of which are now being made in Italy from domestic materials. One of Italy's leading plastics concerns, the Soc. Ital. Resine of Milan, is studying the manufacture of polystyrols, which at present must still be imported from Germany.

This firm's exhibit at the Milan Fair attracted wide attention, as did that of the important Montecatini group (Soc. Gener. per l'Industria Mineraria e Chimica, Milan). The latter concern, which has a new factory at Cesano Maderno with annual output of 750 tons of polyvinyl chloride, featured as a novelty its vinyl products such as elastic and non-elastic tubing; leather substitutes for upholstery purposes as well as for bookbinding and pocketbooks; rainproof garments, acid- and alkali-resistant packings, cable insulations, and also special plastifiers for vinyl plastics.

The S.A.F.I. (Soc. An. Fili Isolati)—"Isola" combine of Milan showed flexible insulated wires and cables ranging in diameter from 0.04 to 3.5 mm. as well as a wide variety of insulating materials.

In the German Pavilion the Venditor concern of Troisdorf featured articles from a number of well-known German materials as Trolitul, Mipolam, Pollopas, etc. Incidentally, similar wares were also seen at the stand of Th. Mohwinckel, of Milan, who has introduced these materials into Italy as well as the finished and half-finished goods made from them.

The I. G. Farbenindustrie A.G., Frankfurt A.M., exhibited its new PeCe fiber as well as fishing nets and ropes made from it.

FAR EAST

INDO-CHINA

Exports of crude rubber from Indo-China during the first seven months of 1940 came to 30,522,240 kilos, against 20,071,483 kilos, the corresponding period of 1939. Shipments for all of 1939 totaled 66,266,205 kilos.

MALAYA

Plantation Statistics

Recent figures of the Department of Agriculture, Straits Settlements and Federated Malay States, show that at the end of 1939 the area under rubber in British Malaya totaled 3,442,649 acres, with 2,107,117 acres covered by 2,511 estates of 100 acres and over, and the rest small holdings under 100 acres. Europeans own 1,001 estates, covering 1,578,450 acres; more than half are in the F. M. S. Chinese own 1,047 estates, totaling 342,805 acres; Indians, 373 estates, covering 91,055 acres.

By the end of 1939, 837 bud-grafted areas covered 284,275 acres. Of these, 63 areas, totaling 151,599 acres, were 1,000 acres or more in extent. The mature budded area was 174,197 acres, but of this 123,382 acres were actually in tapping. In 1939, 33,130 acres were budded.

The production of rubber in 1939 by estates of 100 acres and over came to 244,915 tons, against 246,220 tons in 1938; smaller holdings had a total output of 116,569 tons, against 114,678 tons. Gross exports from Malaya were 553,324 tons and included 22,515 tons latex and 1,652 tons of sole crepe. The net Malayan exports of rubber were 375,474 tons.

There is also a fair foreign trade in rubber seeds specially selected for planting purposes, and last year Malaya shipped 51,134 pounds of such seed with a value of $44,609 (Straits currency).

For several years prior to 1931, Malaya spent from three to five million dollars annually on rubber packing cases and parts and fittings for cases. Then these imports sharply declined and in 1939 dropped to a new low level of 525,145 plywood cases, value $453,894. Conditions in Europe are largely responsible for this latest recession, but local manufacture and the tendency to turn to other methods of packing are also factors.

Rubber Trade in 1940

In reviewing Malaya's trade during the first half of 1940 at the semi-annual meeting of the Singapore Chamber of Commerce, J. I. Dawson stated that with the heavy buying of barter rubber and the improved prices for rubber, producers should be doing well now. The average price for the first six months of the current year was 37.34 cents per pound (Straits currency); the highest price was 39¾ cents per pound on May 15, and the lowest, 35⅜ cents on April 24. However, gains will feel the effect of the war taxes, to say nothing of the 100% excess profits tax. Some recent reports already show the extent to which these levies have been slicing into shareholders' portions.

Exports of rubber during the first half of 1940 were 365,667 tons, or 118,579 tons more than in the corresponding period of 1939.

Planters Prefer Seedlings

The preference of planters for seed over bud-grafts continues to become more and more pronounced, according to Eric Macfadyen at the annual meeting of the Prang Besar Estates, Ltd., and he substantiated his remarks with statistics. At one stage he referred to an estate of Dunlop Plantations which had been budded on a commercial scale in 1928 with P.B. 25 (a Prang Besar clone still much in favor for new planting and replanting). This estate covers 301 acres, and in 1939, that is 11 years after budding, the average crop was 1,220 pounds per acre, against 877 pounds an acre in 1938 and 631 pounds an acre in 1937. The estimate for 1940 is 1,400 pounds an acre.

On the other hand, when discussing Prang Besar itself, Mr. Macfayden revealed that one small garden planted with hand-pollinated seed and now in its eleventh year, yielded at the rate of 2,000 pounds an acre, in the year under review. Even more promising yields have been reported from an area of 54 acres planted in 1933-34 with so-called Prang Besar I.G. seed, that is, seed obtained from a Prang Besar isolation seed

garden of high-yielding bud-grafts. Commercial tapping on 4,046 trees of this area was begun when the trees were 5½ years old, and in the first two months, July and August, 1939, a yield at the rate of 1,023 pounds per acre per year was obtained.

Mr. Macfadyen said that from large-scale experiments carried out by Pataling Rubber Estates, Ltd., it was found that at six years of age, the ratio of the yields from trees grown from ordinary healthy seed, from Prang Besar natural seed, and from Prang Besar I.G. seed, was approximately 1:1.56:2.61.

Since planters using Prang Besar I.G. seed expect not only to be able to get high yields, but also to grow from them stands of sturdier and longer-lived trees than have in many cases been obtained from bud-grafts, it is small wonder that the popularity of this superior seed continues to increase so that the company sold over 3,000,000 seeds in the past business year.

JAPAN

During the first quarter of 1940, Japan exported 3,750,500 kin (100 kin equal 132.3 pounds) of tires and tubes of all kinds, with 2,176,900 kin being automobile tires and tubes. Almost half of the total exports went to Manchukuo. Other important customers were Kwantung, British India, China, and Netherlands India, in the order named.

Japan's imports of scrap rubber and gutta percha during 1939 show a remarkable increase when compared with those for the two preceding years: 373,972 piculs in 1939 (picul equals about 133 pounds) against 91,712 piculs in 1938 and 83,397 piculs in 1937.

A number of larger and many smaller companies are engaged in reclaiming. The 17 larger companies employ the alkali process; 90 minor undertakings use oil methods. These altogether are capable of reclaiming 3,500 tons of rubber annually.

CEYLON

In view of the importance of economizing on foreign exchange, the Director of Commerce and Industries is encouraging producers in Ceylon to adopt as rapidly as possible a substitute for imported plywood cases used in packing rubber. It is suggested that jute gunnies, locally made chests, or coir wrappers might take the place of the imported cases. Incidentally, the possibility of using coir wrappers for baling rubber is being investigated in Ceylon.

AUSTRALIA

It is learned that English and Australian interests are planning to manufacture rubber insulated cables in New South Wales. At present imports of such cables represent a value of £500,000 per year.

The Olympic Tire & Rubber Co. reported net profits of £120,152 for 1939, against £98,220 in 1938. In 1939 a dividend of 14½% was paid.

NETHERLAND INDIA

During September, 1940, Netherland India exported 44,102 long tons of crude rubber. Of this 22,290 tons were estate rubber, and 21,812 tons were native rubber. A comparison of permissible exports from Netherland India during the first nine months of 1940 with actual exports for the period reveals excess exports of 15,183 tons.

Editor's Book Table

BOOK REVIEWS

"A New Dictionary of Chemistry." Edited by Stephan Miall. Published by Longmans, Green & Co., Inc., 55 Fifth Ave., New York, N. Y. 1940. Cloth, 6 by 9 inches, 590 pages. Price $15.

In compiling a work of this type within the space of a single moderate-sized volume, the editor and his colleagues have undertaken a formidable task in the evaluation and selection of material for inclusion. The intent has not been to supplant the more extensive and generally bulky chemical dictionaries already in existence, but rather to supplement these by presenting in handy and concise form brief explanations of chemical terms, together with short accounts of many chemical substances, chemical operations, etc., with the view of including as much recent information as possible. Although readers in certain fields may find the volume wanting in specialized details, the volume as a whole is well compiled and adequate enough to meet many of the requirements of a wide group of technical workers. The editor indicates that future editions that will rectify any important omissions noted in the current work will be forthcoming.

"Handbook of Chemistry and Physics." Twenty-fourth Edition, 1940. Charles D. Hodgman, Editor-in-Chief, and H. N. Holmes, Associate Editor. Published by Chemical Rubber Publishing Co., Cleveland, O. Fabrikoid, 4¾ by 7⅛ inches, 2581 pages. Indexed. Price $3.50.

Several important innovations distinguish the latest edition of this standard reference work for chemists and physicists. Despite an addition of 342 pages, the price has been reduced from $6 to $3.50 this year. The major changes and additions are to be found in the section on organic chemistry, where the table covering the physical constants of organic compounds has been changed from paragraph form to the much handier tabular arrangement. Containing over 300 new compounds, the total number of entries in this table is now well over 9,000. An entirely new feature in this edition is a 65-page table covering physical constants, trade names, and source of supply of over 400 extensively used industrial organic compounds.

The section on commercial plastics has been completely revised to keep pace with developments in this industry; while other revisions and additions have been made throughout this new edition to bring the data in harmony with the results of recent research.

"Chemical Engineering Catalog." Twenty-fifth Annual Edition, 1940. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. Cloth, 8⅛ by 11 inches, 1097 pages. Indexed.

The latest edition of this standard reference work for the process industries follows the lines of previous editions. The products of several hundred firms manufacturing equipment and supplies for chemical and related industries including rubber are catalogued in this volume. In addition to covering equipment, supplies, industrial chemicals, and raw materials, the book includes sections on: laboratory and reagent chemicals; technical and scientific books; and various charts, tables, and nomographs.

"Scientific Price Management, I." Allen W. Rucker. Published by The Eddy-Rucker-Nickels Co., Harvard Square, Cambridge, Mass. Cloth, 9 by 12 inches, 37 pages. Price $5.

This book with its direct, realistic approach to everyday price problems is a working manual for executives who must make decisions relative to prices and costs. Six full-page calculator charts are provided for rapidly determining volume increases in sales under various conditions. The text includes the solution of 15 case studies of price problems ranging from simple price cuts to problems involving advertising and freight allowances and sales bonuses.

"Van Nostrand's Scientific Encyclopedia." Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 1938. Second printing, 1940. Cloth, 7⅜ by 10⅜ inches, 1234 pages. Price $10.

The technical worker in a particular field often needs quick access to information in another branch of science or engineering. Here in a single volume 10,000 terms are covered in alphabetical order, relating to: the basic sciences of chemistry, physics, minerology, geology, botany, astronomy, and mathematics; the applied sciences of navigation, aeronautics, and medicine; and the three branches of engineering—civil, mechanical, and electrical.

Although naturally restricted by the breadth of the subject matter covered in one volume, the comprehensiveness of the book is noteworthy both in the scope of the terms covered and the treatment in the individual article. Concepts of a highly technical nature are so treated as to be of value to the layman as well as the trained technician.

"Handbook for Chemical Patents." Edward Thomas. Published by Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 1940. Cloth, 5½ by 8½ inches. 280 pages. Index. Price $4.

This book, written primarily for the chemist, points out that while only about 15% of all patents issued are chemical, approximately 40% of all patent suits are concerned with chemical patents. In preparing this volume it was the author's intention to bring to light the many concealed pitfalls encountered in the law of chemical patents. The basic nature of patents, together with problems involved in invention, is discussed in early chapters. The anticipation of inventions is dealt with at length, as is patent infringement, with numerous citations from recent patent decisions. Suggestions are made for patent preparation; while other topics include: interferences, amendments after issue, division of application, assignments, licenses, and employes, patent evidence, and foreign patents.

NEW PUBLICATIONS

Bristol Bulletins. The Bristol Co., Waterbury, Conn.

"Recording and Automatically Controlling pH in Industrial Processes with Bristol's Potentiometers." Bulletin 536. 6 pages. The application of Bristol instruments, used in conjunction with suitable electrodes, is discussed with reference to pH control and measurement.

"Bristol's Electronic Pyrometer Controller." Bulletin 544. 6 pages. The instruments described in this bulletin are applicable for automatically controlling temperatures up to 3300° F.

"Bristol's Liquid Level Gauges." Catalog 1015. 20 pages. Various instruments and accessories for liquid level control and measurement are covered in this catalog. Installation diagrams and information are included.

"Electronic Devices for Industry." General Electric Co., Schenectady, N. Y. 20 pages. This booklet briefly lists some of the more important G-E vacuum-tube apparatus and describes its application and method of operation. Phototubes, gas-discharge tubes, and high-vacuum tubes are dealt with, as well as many of the devices which depend on these tubes for their operation.

"Chemical Industries Buyer's Guidebook Number." October, 1940. *Chemical Industries*, 522 Fifth Ave., New York, N. Y. 716 pages. This guidebook is a supplementary annual feature of the magazine, *Chemical Industries*, and contains: chemical prices, 1935-39; a list of associations and societies; a firm directory, arranged geographically; buying guides for raw materials, chemicals, and specialties; and an index of brands, trade names, and synonyms.

"Hewitt Transmission Belts Make Every Unit of Power Count!" Hewitt Rubber Corp., Buffalo, N. Y. This folder briefly states the features of the seven types of Hewitt transmission belts and includes prices and pertinent engineering data.

"The Vanderbilt News." Vol. 10. No. 6. November-December, 1940. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y., 24 pages. A number of interesting articles appear in this issue of the *News,* including one which presents data to show the curing rate of six stocks, representing six different types of acceleration, at processing and bin storage temperatures. Another article deals with the control of temperature for laboratory vulcanizing equipment, while other subjects treated in the issue include: non-tarnishing compound for silvered surfaces, hard rubber from latex, the crescent tear test, testing for ozone resistance, ozone resistant wire insulation, adhesion of cured rubber or neoprene to metal, and compounds for self-curing erasers, self-curing tennis show trim, and printers' roller of 20 Shore hardness.

"Speed Case Free Machining, Open Hearth Steel Plate." W. J. Holliday & Co., Speed Case Plate Division, Hammond, Ind. 24 pages. The history, characteristics, easy machining properties, and application of Speed Case, a low-carbon open hearth steel plate, are discussed in this booklet. The ability of the metal to carburize quickly is stressed in reference to hardening. Among the applications cited are molds for rubber and plastics goods.

"A.S.T.M. Standards on Textile Materials." October, 1940 American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price $2. 380 pages. This annual compilation covers 65 specifications relating to quality, tolerances, test procedures and equipment, and definitions developed by the A.S.T.M. through the work of its Committee D-13 on various textile materials. In addition to standards on asbestos, glass, jute, rayon, and wool, 12 standards are classified as general and 22 standards refer to cotton, among which several are of interest to the rubber industry. Of the four proposed methods, one is on the Test for Accelerated Aging of Textiles, and another deals with Calculating Number of Tests for Average Quality. The book also includes comprehensive abstracts of three papers presented at the March, 1940, meeting of Committee D-13, of which none appear to be related to textiles for rubber. Photomicrographs of textile fibers, tabular data, and a glossary of terms are included.

"The Dynamics of National Strength and Security." No. 38 in a series of booklet-editorials. Farrel-Birmingham Co., Inc., Ansonia, Conn. 20 pages. This study points out that our defense problem and our domestic economic problem, together, constitute a twin-problem, involving the wise division of labor among three needs: (1) the feeding, sheltering, and providing comforts for all our people; (2) the constructing of an adequate national defense; and (3) the progressive improving and expanding of our machinery for useful production. After presenting data supporting its contentions, the booklet concludes with the observation that by encouragement in the United States of a continuous expansion in the use of productive equipment, we will be in a position to avoid any limitation upon our progress with respect both to national defense and our domestic economy.

"1941 Year Book." The Tire & Rim Association, Inc., Akron, O. Price $2. 120 pages. This reference manual shows up-to-date standards for tires, tubes, rims, and valves as used on various types of vehicles. The classification is by tires as follows: passenger car, truck and bus, earth moving, agricultural, industrial, airplane, motorcycle. In addition to sizes, the book shows load and inflation tables and sketches of rim contours.

"Condor Flat Whipcord Endless Belts—Drive Data Book." The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. 12 pages. In this booklet are listed standard sizes of two styles of the firm's endless flat belt which are now carried in stock and are capable of handling drives from ¼ to 25 h.p. The data show more than 1,500 drives of all types available with these stock belts and point to a method of handling endless belts for the growing field of pivoted motor base drives with short centers.

"Goodrich V-Belt Data Book." The B. F. Goodrich Co., Akron, O. 168 pages. This reference book gives prices and

lists the numbers and sizes of Goodrich V-belts for the various commercial makes of electric refrigerators, washing machines, water pumps, beer pumps, stokers and oil burners, gasoline pumps, wood-working machines, air compressors, power lawn mowers, and other miscellaneous machines.

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DIELECTRIC PROPERTIES OF ORGANIC COMPOUNDS. S. O. Morgan and W. A. Yager, *Ind. Eng. Chem.,* Nov., 1940, pp. 1519-28.

LATEX TECHNOLOGY. IX and X. Development in the Last Ten Years on the basis of German Patent Literature. C. Philipp, *Gummi-Ztg.,* Sept. 6, 1940, pp. 643-44; Sept. 13, pp. 664-65. (To be continued.)

FACTORY CONTROL IN THE RUBBER INDUSTRY. III. Testing Solutions. *Gummi-Ztg.,* Sept. 20, 1940, pp. 682-83.

THE INVASION OF THE NEWER SYNTHETICS IN THE FIELD OF HARD RUBBER APPLICATION. A. Schwarz, *Kautschuk,* Aug., 1940, pp. 97-101.

A LABORATORY PROCESS FOR THE DEGRADATION OF BUNA S AND BUNA SS. W. Esch and R. Nitsche, *Kunststoffe,* Aug., 1940, pp. 224-28.

PROPERTIES AND USES OF THE NEW VINYL PLASTICS. L. Kollek, *Kunststoffe,* Aug., 1940, pp. 229-32.

INVESTIGATION OF THE IMPACT BENDING STRENGTH OF PLASTICS. W. Kuntze, R. Nitsche, and H. V. Mertens, *Kunststoffe,* July, 1940, pp. 193-99.

X-RAY TESTS ON SYNTHETICS. *Kunststoffe,* Sept., 1940, pp. 265-66.

BUNA FOR HARD RUBBER LININGS. E. Gartner, *Kautschuk,* Sept., 1940, pp. 109-16.

ON THE THEORY OF INSULATING MATERIALS. B. Boning, *Kolloid-Z.,* Aug., 1940, pp. 136-41.

SYNTHETICS INSTEAD OF LEATHER. F. Stather and H. Herfeld, *Kunststoffe,* Sept., 1940, pp. 253-60.

CORROSION OF SYNTHETICS. A. V. Blom, *Kunststoffe,* Aug., 1940, pp. 221-23.

ADVANCES IN THE PRODUCTION, WORKING, AND APPLICATION OF SYNTHETICS. K. Mienes, *Kunststoffe,* Aug., 1940, pp. 224-28.

RUBBER IN POWER TRANSMISSION. P. Grodzinski, *Rubber Age (London),* Oct., 1940, pp. 221-22.

RUBBER'S USES IN PAINT GRINDING. *Rubber Age (London),* Oct. 1940, p. 223.

USING RUBBER IN RAYON WASTE PRODUCTS. *Rubber Age (London),* Oct., 1940, p. 225.

PACKING SHEET RUBBER IN BARE-BACK BALES. *Rubber Age (London),* Oct., 1940, p. 226.

DETERMINATION OF SCORCHING OF RUBBER AND SYNTHETIC COMPOUNDS BY USE OF THE MOONEY PLASTOMETER. J. V. Weaver, *Rubber Age (N. Y.),* Nov., 1940, pp. 89-95.

SOME GENERAL PRINCIPLES OF COMPOUNDING RUBBER LATEX. R. O. Babbit, *Rubber Age (N. Y.),* Nov., 1940, pp. 96-98, 106.

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PROCESSING OF NEOPRENE. R. B. F. F. Clarke, *Trans. Inst. Rubber Ind.,* Aug., 1940, pp. 51-68.

FRACTIONATION OF RUBBER. G. F. Bloomfield and E. H. Farmer, *Trans. Inst. Rubber Ind.,* Aug., 1940, pp. 69-86.

CARBON BLACK IN RUBBER COMPOUNDING. D. Parkinson, *Trans. Inst. Rubber Ind.,* Aug., 1940, pp. 87-104.

Patents and Trade Marks

MACHINERY

United States

2,218,138. **Apparatus to Manufacture Insulated Wire or the Like,** Comprising a Continuous Extruder Connected to a Vulcanizer by a Shiftable Fluid-Sealing Casing. J. R. Stricklen, assignor to National Rubber Machinery Co., both of Akron, O.

2,218,504. **Stretching Apparatus** to Prepare Cord for Pneumatic Tires, Belts, Etc. C. C. Cadden, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,218,527. **Feeding Predetermined Charges of Sponge Rubber Compounds to Traveling Molds.** L. H. De Wyk, Ansonia, and L. H. De Wyk, Jr., assignors to Sponge Rubber Products Co., both of Shelton, all in Conn.

2,218,751. **Rubber Extruder** with Exterior Knife. W. E. Humphrey, Jeannette, Pa., assignor to Pennsylvania Rubber Co., a corporation of Pa.

2,219,385. **Hydraulic Press** with Floating Connection between Auxiliary Rams and Press Platen. W. Ernst, Gilead, O., assignor to Hydraulic Press Corp., Inc., Wilmington, Del.

2,219,466. **Control Valve** for Fluid Motors. G. E. Beharrell, Streetly, J. Wright, Stoke Park, Coventry, and H. Trevaskis, Sutton Coldfield, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,220,404. **Tire Balancer.** R. D. Hulslander, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,220,760. **Machine for Uniformly Spacing Parallel Cords.** J. G. Gates and J. H. V. Finney, assignors to Gates Rubber Co., all of Denver, Colo.

2,220,798. **Power Control System** for Hydraulic Presses. R. W. Dinzl, Narberth, Pa., assignor, by mesne assignments, to Baldwin Locomotive Works, a corporation of Pa.

2,221,135. **Form and Method for Making Rubber Dress Shields.** M. E. Hansen, assignor to American Anode, Inc., both of Akron, O.

2,221,323. **Apparatus to Test, by Electrical Means,** Thin Hollow Rubber Goods for Defects. J. R. Gammeter, Akron, O.

2,221,436. **Skiving Machine.** J. F. Remington, Akron, O.

2,221,516. **Continuous Thickness Gage.** C. M. Hathaway, Niskayuna, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,221,695. **Apparatus and Method of Making Thin Hollow Rubber Articles.** (Latex.) I. W. Robertson, Los Angeles, Calif.

2,221,742. **Rubber Molding Press.** J. Hoza, Zlin, Czechoslovakia.

Dominion of Canada

392,050. **Thread Covering Apparatus.** Firestone Tire & Rubber Co., assignee of S. W. Alderfer, both of Akron, O., U. S. A.

392,231. **Tire Vulcanizing Mold** for Retreading. Super Mold Corp., assignee of E. A. Glynn, both of Lodi, Calif., U. S. A.

United Kingdom

525,447. **Electrically Heated Vulcanizers.** Dill Mfg. Co.

525,467. **Apparatus and Process to Make Rubber Filaments.** F. H. Reichel.

525,913. **Presses.** J. Shaw & Sons (Salford), Ltd., Leyland & Birmingham Rubber Co., Ltd., J. B. Shaw, and H. J. Butcher.

526,045. **Vulcanizers** for Molding Tires. D. Bridge & Co., Ltd., (National Rubber Machinery Co.).

526,659. **Presses** for Vulcanizing a Rubber Article Such as a Pneumatic Tire. McNeil Machine & Engineering Co.

PROCESS

United States

2,218,351. **Reenforced Rubber Matrix** for Printing Plates. O. B. Crowell, assignor to Viceroy Mfg. Co., Ltd., both of Toronto, Ont., Canada.

2,218,710. **Stiffening Bandages and Stiffening Bandages Commercial Products.** (Synthetic.) W. O. Herrmann, Deisenhofen, and B. Braun, Melsungen, assignors to Chemische Forschungsgesellschaft, m.b.H., Munich, all in Germany.

2,219,755. **Porous Elastic Applicators.** J. F. Skold, assignor to C. E. Zimmerman, both of Chicago, Ill.

2,219,829. **Elastic Fabrics.** M. C. Teague, Ridgewood, N. J., and T. G. Hawley, Jr., Naugatuck, Conn., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,220,213. **Composite Thread** Comprising Elastic Thread and a Relatively Inelastic Thread. P. E. F. Clay, Radcliffe-on-Trent, England.

2,220,231. **Tobacco Pouch** from Sheet Rubber Hydrochloride. P. M. Gilfillan, assignor to Shellmar Products Co., both of Mount Vernon, O.

2,220,549. **Finishing a Rubber-Impregnated Felt Base with a Lacquer Film.** M. O. Schur and B. G. Hoos, assignors to Brown Co., all of Berlin, N. H.

2,221,316. **Inextensible Rubber Threads,** the Elasticity of the Thread Being Restorable after Wearing, Through the Use of a Soluble Hydrophilic Colloid in the Rubber Mix. T. L. Shepherd, London, England.

2,221,470. **Flexible Multi-Ply Pressure Containers.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,221,490. **Reclaiming Rubber**—Subjecting Small Pieces of Scrap to Mechanical Action in Internal Mixer at Elevated Temperature, Adding Small Quantity of Water to Produce Steam, and Continuing Mechanical Treatment until Scrap Is Converted into Homogeneous Plastic Mass. T. Robinson, Smithtown, assignor to Lancaster Processes, Inc., New York, both in N. Y.

2,221,534. **Athletic Balls.** W. J. Voit, Los Angeles, and L. C. Weimer, Southgate, both in Calif.; Weimer assigner to Voit.

2,221,642. **Anti-Skid Tire Tread** by Molding the Tread with Relatively Wide Circumferential Ribs, Separated by Grooves, and Dividing These Ribs into Narrow Ribs by Cutting Grooves Parallel to the Molded Grooves. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

Dominion of Canada

392,211. **Rubber Threads** Consisting of Three or More Filaments Integrally United and Arranged in a Compact Group without Twisting or Braiding. (Latex.) International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of R. G. James and S. F. Smith, co-inventors, both of Birmingham, all in England.

392,212. **Rubber Threads** Consisting of Three or More Filaments Integrally United and Arranged in a Compact Group. (Latex.) International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of R. G. James and S. F. Smith, co-inventors, both of Birmingham, all in England.

United Kingdom

525,671. **Varnishing Rubber, Etc.** A. Wacker Ges. Fur Elektro-Chemische Industrie, Ges.

525,756. **Patterned Rubber.** Dunlop Rubber Co., Ltd., and N. Jones.

526,873. **Rubber Tubes** for Tire Casings. Firestone Tire & Rubber Co., Ltd., (Firestone Tire & Rubber Co.).

526,781. **Heel Grips or Protectors** for Shoes, Etc. Sussex Rubber Co., Ltd., and S. Bailey.

CHEMICAL

United States

2,217,723. **Sealing Composition** for Internal Combustion Engines—Blown Castor Oil and Pontianak Gum, Manila Gum, Soluble Copal, or Philippine Gum. C. A. Benoit, Brooklyn, assignor to Permatex Co., Inc., Sheepshead Bay, both in N. Y.

2,217,918. **Rubber Miscible Oils** Adapted to Be Added to Rubber Mixes in Amounts Exceeding 50% in the Rubber and Capable of Co-Vulcanization with Rubber and Sulphur—Obtained from Petroleum Oils. F. Rostler and V. Mehner, assignors to Naftolen-Gesellschaft zur Verwertung der Rostler-Mehner'schen Verfahren m.b.H., all of Vienna, Germany.

2,217,919. **Unsaturated Hydrocarbon Compositions** (90% Carbon and 10% Hydrogen) with a Molecular Weight Range of from 300 to 1,000 and Capable of Vulcanization and Nitration. F. Rostler, Wilmington, Del., and V. Mehner, Vienna, Germany.

2,218,167. **Vulcanized Composition** Comprising 100 Parts by Weight of Rubber, Sufficient Sulphur to Convert Rubber to Hard Rubber, and at Least 40 Parts of an Elastic High Molecular Weight Polymer of a Branched-Chain Aliphatic Mono-Olefin. (Synthetic.) H. H. Harkins, North Providence, R. I., assignor to United States Rubber Co., New York, N. Y.

2,218,238. **Transparent Rubbery Sheet** Comprising 100 Parts of a Polyvinyl Acetal Resin and, as an Elasticizer, at Least 40 Parts of Methoxyethyl Maleate. (Synthetic.) J. J. Gordon, Kingsport, Tenn., assignor to Eastman Kodak Co., Rochester, N. Y.

2,218,239. **Transparent Rubbery Sheet** Comprising 100 Parts of a Polyvinyl Acetal Resin and at least 40 Parts of Di-Isoamyl Maleate. (Synthetic.) J. J. Gordon, Kingsport, Tenn., assignor to Eastman Kodak Co., Rochester, N. Y.

2,218,362. **Rubber-like Interpolymers** Made by Polymerizing in Aqueous Medium a Dispersion of Butadiene and Methyl Methacrylate (15 to 50%). (Synthetic.) H. W. Starkweather, New Castle County, and A. M. Collins, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, all in Del.

2,218,457. **Dehydrogenation of Primary and Secondary Alcohols.** C. F. Winans, Fairlawn, O., assignor to Wingfoot Corp., Wilmington, Del.

2,218,617. **Amorphous Rubber Hydrochloride Composition** Containing a Benzol-Type Solvent and a Non-Solvent Ketone Gel Retarding Agent. J. H. McKenzie, assignor to Marbon Corp., both of Chicago, Ill.

2,218,645. **Plasticized Polyvinyl Chloride** Containing an Alkali Metal Phosphate. (Synthetic.) A. B. Japs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,218,661. **Antioxidant**—Hydrogenated Reaction Product of a Diarylamine with an Aldehyde or Ketone. W. L. Semon, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,219,469. **Preservation of Latex** with a Small Amount of Arsenic Trioxide and 0.2 to 0.75% Ammonia. W. E. Cake and E. M. McColm, both of Boenoet, Asahan, Sumatra, assignors by mesne assignments, to United States Rubber Co., New York, N. Y.

2,219,550. **Resilient Composition** Comprising Cork Coated with a Heat-Cured Reaction Product of an Alkaline Polysulphide and an Organic Compound Having the Formula XCH_2RCH_2X', Where R Is a Divalent Organic Radical and X and X' are Monovalent Negative Substituents. (Synthetic.) S. M. Martin, Jr., Trenton, assignor to Thiokol Corp., Yardville, both in N. J.

2,219,661. **Insoluble Rubber-like Composition** Obtained by Dissolving an Ester of Polyacrylic Acid and a Monohydric Aliphatic Alcohol in a Solvent, Treating the Ester in Solution with Copper and a Copper Compound, and Separating the Product from the Solvent. (Synthetic.) E. Schnabel, Berlin-Lichterfelde, Germany, assignor to Resistoflex Corp., New York, N. Y.

2,220,152. **Coating Composition**—Two Ounces Rubber, Two Ounces Paraffin Wax, and Three Pounds Resin, Dissolved in One Gallon of Petroleum Naphtha. C. R. Hill, Toronto, Ont., Canada.

2,220,460. **Bonding Rubber to Ferrous Metal** by Incorporating Red Phosphorous and a Halogen-Containing Activator into Vulcanizable Rubber Composition and Uniting Rubber to Metal by Application of Heat. E. L. Scholl, A. W. Oakleaf, and J. D. Morron, all of Detroit, Mich., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,220,759. **Compounding Ingredient for Acid and Moisture-Resistant Hard Rubber**—Mixture of Finely Divided Silica and Glass (325 Mesh), Obtained by Grinding Plate Glass with Sand and Treating the Mixture with Acid. N. S. Barbisch, Butler, Pa.

2,220,930. **Polymerization of Olefins** at Room Temperature in Presence of a Compound with Formula MX_mR_n, Where M represents Aluminum, Gallium, or Boron; X Represents a Halogen; R Represents a Monovalent Hydrocarbon Radical; m and n Each Represent an Integer 1 or 2 and $m+n=3$. C. A. Kraus, Providence, R. I., assignor to Standard Oil Development Co., a corporation of Del.

2,220,980. **Parasiticide Containing 2, 5-Dimethyl Pyrrole.** W. P. ter Horst, Packanack Lake, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,220,981. **Fungicide** Containing a Mono-Hydroxy-Diphenylamine in Which the Hydroxyl Hydrogen Atom is Replaced by an Acidyl Group or a Boric Acid Residue. W. P. ter Horst, Packanack Lake, N. J., assignor, by mesne assignments to United States Rubber Co., New York, N. Y.

2,221,033. **Transparent Rubbery Sheet** from Polyvinyl Butyraldehyde Acetal Resin and Di-Iso-Amyl Sulphone. (Synthetic.) D. R. Swan, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,221,034. **Transparent Rubbery Sheet** from Polyvinyl Butyraldehyde Acetal Resin and Amyl Succinate. (Synthetic.) D. R. Swan, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,221,035. **Transparent Rubbery Sheet** from Polyvinyl Butyraldehyde Acetal Resin and a Dialkyl Maleate (Six to Eight Carbon Atoms). (Synthetic.) D. R. Swan, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,221,036. **Transparent Rubbery Sheet** from Polyvinyl Butyraldehyde Acetal Resin and Ethoxy-Ethyl Maleate. (Synthetic.) D. R. Swan, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,221,147. **Preparation of Aminated Esters of Sulphydryl Compounds.** R. A. Mathes, Akron,

O., assignor to B. F. Goodrich Co., New York, N. Y.

2,221,207. **Antioxidant**—N, N' Diaryl Arylene Diamine, Where at Least One Aryl Group Contains an Aralkyl Substituent. R. L. Sibley, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,221,214. **Coagulant Composition for Latex Deposition**—Base Emulsion Comprising Volatile Solvent, Water, Oleic Acid, Ammonia, Zinc Acetate, with Rubber Cement and Pine Resin Added to Emulsion. G. T. Buchanan, Winnsboro, S. C.

2,221,304. **Rubber-like Compound** Obtained by Heating a Mixture of Following: Crude Oil, 64 (by Weight); Vegetable Matter, 20; Sulphur Chloride, 10; Powdered Talc, 4; Magnesium Oxide, 4; Caustic Soda, 2½; Water, 1½; Water Carbon Black, 3; and Benzol, 1¼. (Synthetic.) H. Wilson, assignor to Process Rubber Corp., both of New Orleans, La.

Dominion of Canada

392,026. **Rubber Insulating Compound** Comprising 33 to 38 Parts (by Weight) Thermally Plasticized Crude Rubber; 28 to 33 Parts Finely Divided Zinc Oxide; 26 to 31 Parts Finely Divided Inert Filler; 1 to 3 Parts Antioxidant; 0.5 to 2.5 Parts Plasticizer; and 1 to 2.5 Parts Tetramethyl-Thiuram Disulphide. Canadian General Electric Co., Ltd., Toronto, Ont., assignee of M. H. Savage and F. C. Spargo, both of New Haven, and E. W. Schwartz, Bridgeport, co-inventors, all in Conn., U. S. A.

392,092. **Homogeneous, Stable Composite Product** of Chlorinated Rubber and a Cellulose Ester. R. M. Ritter, Philadelphia, Pa., U. S. A., assignee of H. Michaelis, Jr., Berlin-Waidmannslust, Germany.

392,195. **Artificial Dispersion of Rubber in Aqueous Medium,** Using an Alkali Silicate-Saponified Soap. Dispersions Process, Inc., New York, N. Y., assignee of R. H. Ewart, Naugatuck, Conn., both in the U. S. A.

392,345. **Waterproof Adhesive Composition.** (Latex.) Patent & Licensing Corp., New York, N. Y., assignee of E. O. Groskopf, Rutherford, N. J., both in the U. S. A.

United Kingdom

525,335. **Process for Plasticizing Rubber.** L. Cooper.

525,534. **Deterioration Retarders.** United States Rubber Co.

525,542. **Manufacture and Production of Polymerization Products from Isobutylene.** (Synthetic.) G. W. Johnson, (I. G. Farbenindustrie A.G.).

525,656. **Concentration of Dispersions of Rubber or Rubber-like Substances.** (Latex.) C. Bondy.

525,733. **Manufacture of Synthetic Rubber-like Materials.** I. G. Farbenindustrie A.G.

525,737. **Antioxidants.** W. Baird, M. Jones, and Imperial Chemical Industries, Ltd.

525,781. **Concentrating Rubber Latex.** Revertex, Ltd., (Metallges. A.G. and O. Enclip).

525,973. **Oil- and Solvent-Resisting Rubber-like Materials.** (Synthetic.) R. G. R. Bacon, W. Baird, B. J. Habgood, L. B. Morgan, and Imperial Chemical Industries, Ltd.

526,072. **Manufacture of Vulcanized Synthetic Rubber-like Materials.** W. Baird, B. J. Habgood, and Imperial Chemical Industries, Ltd.

526,131. **Oil- and Solvent-Resisting Rubber-like Materials.** (Synthetic.) R. G. R. Bacon, B. J. Habgood, R. Hill, and Imperial Chemical Industries, Ltd.

526,387. **Separation of Butadiene from Hydro-Carbon Mixtures Containing Same.** (Synthetic.) Dow Chemical Co.

526,566. **Rendering Rubber Fireproof.** Soc. Franco-Belge du Caoutchouc Mousse.

526,745. **Accelerators**—Derivatives of Hexmethylene-Dithiocarbamic Acid. E. I. du Pont de Nemours & Co., Inc., and I. Williams.

526,765. **Working-Up of Rubber-like Sulphur-Containing Organic Condensation Products.** (Synthetic.) Silesia, Verein Chemischer Fabriken.

526,894. **Rubber Compositions** with Electrical Conducting Properties. Liverpool Electric Cable Co., Ltd., and L. T. Reynolds.

GENERAL

United States

2,217,730. **Elastic Cap** for Automobile Outside Door Locking Handle. F. A. Cooley, assignor to Ternstedt Mfg. Co., both of Detroit, Mich.

2,217,754. **Rubber Protecting Boot** for Chair Legs. W. J. Johnson, Evanston, assignor to Johnson Chair Co., Chicago, Both in Ill.

2,217,755. **Fountain Pen.** G. Larsen, Springfield, N. J., assignor to L. E. Waterman Co., New York, N. Y.

2,217,826. **Composite Rayon Cord** to Reenforce Rubber Products, Comprising a Multiplicity of Untwisted Filaments Held Together by a Sheath. J. A. Van Laer, Yonkers, N. Y., assignor to American Enka Corp., Enka, N. C.

2,217,884. **Fountain Pen.** A. N. Andrews, Los Angeles, Calif.

2,217,892. **Striker Plate** for Door Latch Bolts. H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,217,941. **Composite Rubber-in-Shear Spring.** J. P. Burke, Knoxville, Tenn.

2,217,993. **Wheel for Dual Tires.** G. Quillin, Akron, O.

2,217,996. **Doorstop.** M. J. Sasgen, Chicago, Ill.

2,218,008. **Tire Valve.** J. H. Rhodes, Legrand, Iowa.

2,218,015. **Bottle Wiper** Utilizing Stretched Rubber Bands for Bottle Vending Machines. M. H. Voigtritter, assignor to Mills Novelty Co., both of Chicago, Ill.

2,218,063. **Blowout Preventer** with Resilient Seal. A. J. and K. T. Penick, both of Houston, Tex.

2,218,143. **Dashboard Tire Pressure Indicator.** R. R. Birchfield, Shreveport, La.

2,218,170. **Lead Wires for Firing Devices.** W. C. Hunt, assignor to Hercules Powder Co., both of Wilmington, Del.

2,218,176. **Structure Utilizing an Organic Polymeric Disulphide** for Preventing Static Electricity. (Synthetic.) J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Yardville, N. J.

2,218,219. **Resiliently Cushioned Type Binder.** J. J. Riehl, Cleveland, O.

2,218,260. **Mold** for Plastic Toys with Side and Bottom Walls of Rubber-like Material. J. B. Forbes, Oak Park, assignor to J. L. Wright, Inc., Chicago, both in Ill.

2,218,269. **Stocking** with Rolling-Front Garter Band. C. Shelton, assignor to Vanity Fair Silk Mills, both of Reading, Pa.

2,218,393. **Proportioning Apparatus** of Hard Rubber. J. Corydon, Providence, R. I.

2,218,410. **Balancing Weight** for Automobile Wheels. I. A. Weaver, assignor to Weaver Mfg. Co., both of Springfield, Ill.

2,218,413. **Surgical Hosiery.** A. R. Bell, assignor of 25% each to W. J. and F. S. Horn, all of Philadelphia, and 25% to A. J. Miller, Bala Cynwyd, all in Pa.

2,218,497. **Electrical Insulator** for Supporting a Line Conductor. D. H. Smith, Hempstead, N. Y., and H. H. Wheeler, Millburn, N. J., assignors to Western Union Telegraph Co., New York, N. Y.

2,218,535. **Clutch Facing Comprising** Rubber Cement Bonded Layers of Asbestos Sheet. M. F. Judd, Stratford, Conn., assignor to Raybestos-Manhattan, Inc., Passaic, N. J.

2,218,690. **Pneumatic Protector Fenders** for Automobiles. C. B. Strauch, Milwaukee, Wis.

2,218,749. **Imitation Tree Bark.** W. H. Burke, Superior, Wis., assignor of one-half to R. C. Ware, Minneapolis, Minn.

2,218,747. **Foundation Garment.** J. X. Gagnon, Aldenville, assignor to Standard Corset Co., Holyoke, both in Mass.

2,218,791. **Flexible Siding Material.** L. Herscovitz, Park Ridge, Ill., assignor to Ruberoid Co., New York, N. Y.

2,218,829. **Wringer Rolls** (Manual Pressure Reset). F. A. Parish, assignor to Automatic Washer Co., both of Newton, Iowa.

2,218,910. **Safety Brake** for Motor Vehicles, Actuated by Tire Deflation. A. A. Hill, Passaic, N. J.

2,218,919. **Inflatable Football** or the Like. P. S. Madsen, Bethany, assignor by mesne assignments, to Seamless Rubber Co., New Haven, both in Conn.

2,218,931. **Balloon Inflater.** A. W. Carlson, Worcester, Mass.

2,218,946. **Elastic Leader** for Fishing Lines. G. L. Barnett, Millsboro, Del.

2,219,047. **Hose and Coupling Structure.** A. D. Maclachlan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,219,105. **Diverter Valve** for Water Lines. F. Klein, Bayside, N. Y., assignor to Keystone Brass & Rubber Co., Philadelphia, Pa.

2,219,130. **Toy and Display Figure** with Suction Cup Supports. M. Herrmann, Chicago, Ill.

2,219,134. **Combination Cover and Venting Cap** for Storage Batteries. R. G. Le Clercq and R. H. Rector, assignors to Pacific Hard Rubber Co., all of Los Angeles, Calif.

2,219,141. **Combined Cleansing, Massaging, and Toilet Article.** P. Ritz, New York, N. Y.

2,219,153. **Foundation Garment.** I. R. Versoy, assignor to Gerger Bros. Co., both of New Haven, Conn.

2,219,219. **Pipe and Hose Union.** J. Berger, Berlin-Wilhelmsruh, and R. Kaiser, Berlin-Hohenneuendorf, both in Germany, assignors to Michigan Patents Corp., Jackson, Mich.

2,219,235. **Combined Sock and Elastic Band Arch Support.** F. G. Morton, Amsterdam, N. Y.

2,219,238. **Tire-Changing Stand.** E. St. John, Bellaire, O.

2,219,289. **Cellular Rubber-like Joint** for Tile Pipes. C. E. Bennett, Ridgewood, N. J.

2,219,380. **Textile Picker** with Rubber Impact Head. R. W. Chandler, assignor to Graton & Knight Co., both of Worcester, Mass.

2,219,399. **Belt Connecter.** N. I. Ritzert and E. H. Kremer, assignors to Dayton Rubber Mfg. Co., all of Dayton, O.

2,219,475. **Sacroiliac Supporter.** C. J. Flaherty, Bronx, N. Y.

2,219,519. **Water Lubricated Rubber Bearing** for Vertical Pump Shaft. A. O. Fabrin, assignor to Layne & Bowler, Inc., Memphis, Tenn.

2,219,534. **Tire Cover.** C. W. Ryerson, Jackson, Mich., assignor to Ryerson & Haynes, Inc., a corporation of Mich.

2,219,753. **Rubber Toothbrush.** T. W. Seguin, Homewood, assignor of 60% to W. C. Mayland, Chicago, both in Ill.

2,219,945. **Milking Machine Teat Cup.** W. A. Scott, Poughkeepsie, assignor to De Laval Separator Co., New York, both in N. Y.

2,219,961. **Elastic Immersible Mold** for the Production of Hollow Molded Articles. A. C. Plotze, Charlottenburg, Berlin, Germany, assignor, by mesne assignments, to Neocell Products Corp., a corporation of Del.

2,219,972. **Rubber-Covered Pitching Shoe.** G. A. Altendorf, assignor to Giant Grip Mfg. Co., both of Oshkosh, Wis.

2,220,093. **Clothes Wringer.** J. Friedl, Milwaukee, Wis.

2,220,295. **Elastic Disk** for Temporarily Supporting Drinking Glasses, Jars, and Other Containers. R. J. Rodd, Walton-on-Thames, England.

2,220,291. **Game** Utilizing a Golf Ball. E. J. Savoy, Oklahoma City, Okla.

2,220,374. **Respirator.** H. B. Lewis, Los Angeles, Calif.

2,220,417. **Resilient Wheel Construction** Utilizing Rubber Blocks. N. G. A. Malmquist, assignor to Svenska Aktiebolaget Bromsregulator, both of Malmö, Sweden.

2,220,444. **Expansion Joint** for Spaces between Construction Members Comprising Fibrous Material and Latex. S. G. Gisslander and R. R. Sterrett, both of Naugatuck, Conn., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,220,495. **Tire Pressure Gage.** D. F. Ritchie, China Grove, N. C.

2,220,581. **Cylindrical Rubber-in-Shear Spring and Shield or Cover for Spring.** E. H. Piron, New York, N. Y., assignor to Transit Research Corp., a corporation of N. Y.

2,220,593. **Health Belt.** G. W. Watson, Detroit, Mich.

2,220,632. **Flexible Insulated Shaft Coupling.** P. A. Homer, Victoria, B. C., Canada.

2,220,628. **Highway Expansion Joint.** T. W. Stedman, assignor to Resilient Products Corp., both of New York, N. Y.

2,220,669. **Rubber-Covered Impeller** for Centrifugal Pumps. F. B. Allen, Lower Merion Township, assignor to Allen-Sherman-Hoff Co., Philadelphia, both in Pa.

2,220,721. **Leather Wringing Machine.** W. C. Johnson, assignor to Machinery Development Co., both of Milwaukee, Wis.

2,220,787. **Windshield** with Elastic Shock Absorbers. C. Hooppaw, Washington, D. C.

2,220,803. **Elastic-Top Hosiery.** J. L. Lesher, assignor to Unrivaled Hosiery Mill, Inc., both of Williamstown, Pa.

2,220,900. **Umbrella Handle** for Holding Rubbers, Sandals, or Overshoes. R. G. Halstead, New York, N. Y.

2,220,958. **Tensioned Yarn and Thread and Method of Forming Same.** H. Y. Jennings, Fall River, Mass., assignor, by mesne assignments, to Copeman Laboratories Co., Flint, Mich.

2,220,994. **Shaft Packing.** C. E. Wiessner, assignor to Durametallic Corp., both of Kalamazoo, Mich.

2,220,995. **Classification of Comminuted Material** of Various Particle Sizes by Means of a Perforated Elastic Sheet. T. L. Wilson, Upper Montclair, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,221,042. **Horse Collar** with Pneumatic Neck Pad. J. Carter, Richland, Iowa.

2,221,056. **Jar-Holding Device** with Rubber Grip. L. E. Mason, Columbus, O.

2,221,114. **Bed Covering** with Elastic Hold-Down Members. F. M. Schwartz, Mt. Vernon, N. Y.

2,221,154. **Apparatus to Test Concentricity of Spark Plug Porcelains.** C. C. Soner, Kent, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,221,173. **Sanding or Polishing Wheel** with Sponge Rubber Base. R. S. Gutsell, Phoenix, N. Y.

2,221,210. **Filter** for Dry Cleaner Solvents. L. F. Sodergquist, assignor to National Rubber Machinery Co., both of Akron, O.

2,221,238. **Suction Cup** with Vacuum Release. S. L. Johnson, Catonsville, Md.

2,221,389. **Clothes Wringer.** E. Stroschein, Oshkosh, Wis.

2,221,408. **Pressure Means** for Wringer Rolls, T. L. Perkins, West Springfield, Mass., assignor to Perkins Machine and Gear Co.

2,221,409. **Horn Button Assembly.** A. W. Phelps and E. J. Weinberg, both of Saginaw, assignors to General Motors Corp., Detroit, all in Mich.

2,221,420. **Water Resistant Board** of Calcareous Material and Fibers, Impregnated with a Polymerized Olefin Composition. (Synthetic.) G. W. Clarvoe, Somerville, and L. A. H. Baum, Plainfield, both in N. J., assignors to Johns-Manville Corp., New York, N. Y.

2,221,427. **Swab for Wells.** M. M. Kinley, Houston, Tex.

2,221,431. **Joint Filler** for Concrete Blocks Comprising a Latex and Casein Composition. M. Omansky, Brookline, assignor to Para-Bond Corp. of America, Boston, both in Mass.
2,221,448. **Wet Sanding Machine** with Squeegee. W. L. Goodstein, Pittsburgh, Pa.
2,221,488. **Leaf Spring Assembly** for Motor Vehicle. C. R. Paton, Birmingham, assignor to Packard Motor Car Co., Detroit, both in Mich.
2,221,493. **Elastic Undergarment.** H. Schoebel, West Hempstead, assignor to Model Brassiere Corp., Brooklyn, both in N. Y.
2,221,533. **Athletic Ball.** W. J. Voit, Los Angeles, and L. C. Weimer, Southgate, both in Calif., assignors, by mesne assignments, to W. J. Voit.
2,221,736. **Ophthalmic Mounting.** (Latex.) F. W. Lindblom, Cranston, R. I., assignor to Welsh Mfg. Co., a corporation of R. I.

Dominion of Canada

391,764. **Bearing Lubricant Seal.** Aktiebolaget Bolinder-Munktell, assignee of A. G. F. Wallgren, both of Eskilstuna, Sweden.
391,767. **Rayon Tire Cord.** American Viscose Corp., Marcus Hook, assignee of I. P. Davis, Swarthmore, both in Pa., U. S. A.
391,772. **Tubular Rubber Belt Conveyer.** Bancroft Holdings, Ltd., Hamilton, Ont., assignee of H. S. Johns, Cleveland, O., U. S. A.
391,829. **Elastic Top Stocking.** Nolde & Horst Co., assignee of H. McAdams, both of Reading, Pa., U. S. A.
391,909. **Deposited Rubber Apron.** A. N. Spanel, New York, N. Y., U. S. A.
391,959. **Belt Connector.** Dayton Rubber Mfg. Co., assignee of E. H. Kremer, both of Dayton, O., U. S. A.
392,079. **Sport Trousers** with Elastic Waist Band. S. Simpson, Ltd., assignee of S. Klein, both of London, England.
392,114. **Trailing or Drag Device** for Trawl Nets Using Tire Treads. J. Chant, Plymstock, Devonshire, England.
392,201. **Flexible Diaphragm Railway Car Vestibule.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of United States Rubber Co., New York, N. Y., assignee of R. H. Hambidge, deceased, in his lifetime of Nutley, N. J.; and W. C. Keys, Detroit, Mich., J. A. Younglove, Highland Park, Ill., and R. D. Gartrell, Ridgewood, N. J., all in the U. S. A., co-inventors, with the said R. H. Hambidge, now deceased.
392,260. **Covered Elastic Thread,** the Rubber Filament Having Compressible Longitudinal Fins. Société Internationale de Participations Industrielles & Commerciales, S. A., Luxembourg, Luxembourg, assignee of W. M. Spencer, Tenafly, N. J., U. S. A.
392,263. **Free-Wheel Brake Hub.** G. Steinlein, Mainberg, and L. Bruckmoser, Schweinfurt, co-inventors, both in Germany.
392,270. **Book Rest** with Elastic Page Holder. F. M. Black, Ottawa, Ont.
392,338. **Assist Strap.** National Automotive Fibres, Inc., assignee of G. R. Cunnington, both of Detroit, Mich., U. S. A.

Germany

696,302. **Tire Tread.** Societa Italiana Pirelli, Milan, Italy. Represented by C. and E. Wiegand, both of Berlin.
696,649. **Rubber Belting.** Continental Gummi-Werke A.G., Hannover.
696,672. **Rubber Buffer.** Metallgummi G.m.b.H., Hamburg-Harburg.
697,049. **Rubber and Fabric-Lined Conveyer Hose.** Continental Gummi-Werke A.G., Hannover.

United Kingdom

525,497. **Electric Cables.** Callender's Cable & Construction Co., Ltd., and R. W. Lunt.
525,537. **Microporous Rubber Filtering-Media.** United States Rubber Co.
525,621. **Manufacture of Carbon Blacks,** More Especially for Use in Rubber Mixings. Soc. Italiana Pirelli.
525,757. **Non-Skid Tread Band,** or Over-Tire for Use on Vehicle Wheels. G. Ingram.
525,793. **Nipple.** D. Schwarcz.
525,912. **Tire Valve Pressure Gages.** W. Turner.
526,095. **Bust Supports.** V. F. Kemp, and Kempat, Ltd.
526,163. **Cords** for Reenforcing Tires, Belting, Hose, and Other Articles. Wingfoot Corp.
526,265. **Resilient Shaft Couplings.** F. J. Cleveland. (Svenska Aktiebolaget Bromsregulator.).
526,272. **Eyelash Cosmetic Applicator and Curler.** Kurlash Co., Inc., C. W. Stickel, and W. R. Tuttle.
526,274. **Belts** of Textile and Rubber. A. Touchon.
526,304. **Wrapping Materials.** Dewey & Almy, Ltd., (Dewey & Almy Chemical Co.).
526,328. **Protective Bands** for Cycle and Similar Tires. W. Blackley.
526,383. **Abdominal Supports.** A. Leitch.
526,433. **Brassieres and Like Garments.** R. L. Klin.
526,454. **Cushion Tires** for Vehicle Wheels. Soc. Italiana Pirelli.
526,480. **Flexible Pneumatic Spring** for Vehicle Suspensions. General Motors Corp.
526,577. **Couplings** of Pneumatic Tire Pressure Gages. B. Walters.
526,841. **Corsets.** R. & W. H. Symington & Co., and T. L. McGrath.
526,895. **Electric Cables.** Liverpool Electric Cable Co., Ltd., and L. T. Reynolds.
526,958. **Rubber Compositions and Articles Composed Thereof.** Liverpool Electric Cable Co., Ltd., and L. T. Reynolds.
527,076. **Guideways** for Machine-Gun Ammunition Belts. Dunlop Rubber Co., Ltd., P. J. Bawcutt, and G. C. Brentnall.

TRADE MARKS

United States

381,876. **Empire.** Tires and tubes. Toledo Tire Corp., Toledo, O.
381,955. **Luvon.** Elastic fabrics. United States Rubber Co., New York, N. Y.
381,957. **Camel Saf-T-Ply Rubber.** Tire tube patches. H. B. Egan Mfg. Co., Muskogee, Okla.
382,007. Representation of a coat of arms containing the words: **"En Haute,"** between the words: **"Original Camlin."** Corsets. Camlin Corset Co., Inc., New York, N. Y.
382,071. **Living.** Girdles. International Latex Corp., Dover, Del.
382,115. **Hex-Tretch.** Tire fabric. Callaway Mills, La Grange, Ga.
382,190. **Eril.** Clothing. E. G. Kessler, New York, N. Y.
382,214. **Castniast.** Footwear. M. D. Wood, doing business as Mel Wood, Toledo, O.
382,220. **Autocrat by Dayton.** Tires. Dayton Rubber Mfg. Co., Dayton, O.
382,243. Representation of two broken lines around the word: **"Soruco."** Mechanical rubber goods. Southern Rubber Co., Inc., Greensboro, N. C.
382,302. Representation of a coat of arms containing the letter: **"W"** above the words: **"Faithful Shoes of Quality."** Footwear. Winchell Shoe Mfg. Co., Natick, Mass.
382,303. Representation of fanciful braces enclosing the words: **"Smartaire Footwear."** Shoes. Milius Shoe Co., St. Louis, Mo.
382,310. **Conquest.** Tires. Gates Rubber Co., Denver, Colo.
382,341. **Korpak.** Golf balls. Rubber Specialties Co., Inc., Plymouth Meeting, Pa.
382,342. **Propax.** Golf balls. Rubber Specialties Co., Inc., Plymouth Meeting, Pa.
382,343. **Kraftred.** Tires. General Tire & Rubber Co., Akron, O.
382,391. **Genco Brand.** Rubberized fabrics. R. G. Merton, doing business as Genco Fabrics Co., New York, N. Y.
382,473. Representation of a cloud containing the words: **"Miss America"** between two rows of stars. Shoes. Milius Shoe Co., St. Louis, Mo.
382,669. **Ameripol.** Composition of material composed wholly or in part of natural and synthetic rubber-like materials. B. F. Goodrich Co., New York, N. Y.
382,747. Representation of a double bar intersected by two concentric circles below the word: **"Markrite."** Marking ink, stamp pads, and ink for marking devices. Markrite Mfg. Co., Inc., Dover Village, O.
382,786. **Stenorizer.** Vulcanizer. Stenor, Inc., Stamford, Conn.
382,812. Fanciful representation of a baby wearing a crown. Baby pants. Rand Rubber Co., Brooklyn, N. Y.

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	70,800¶	9,552	15,426	9,593	32,508	33,751§	62,344§	12,582§	42,351	5,415§	7,965a	14,000*	61,866	603,842¶
1940															
Jan. ..	71,541	....	1,049	921	891	5,047	....	....	....	4,547	....	....	....	....	....
Feb. ..	41,797	....	565	1,846	694	3,508	....	....	....	5,243	....	....	....	....	....
Mar. ..	58,283	....	756	1,784	....	3,062	....	....	....	6,057	....	....	....	....	....
Apr. ..	70,135	....	606	1,612	....	3,096	....	....	....	2,000*	....	....	....	....	....
May ..	50,621	....	589	2,100	....	3,108	....	....	....	2,500*	....	....	....	....	....
June ..	53,266	....	543	1,181	....	1,062	....	....	....	3,000*	....	....	....	....	....
July ..	69,374	....	783	1,902	....	5,112	....	....	....	3,000*	....	....	....	....	....
Aug. ..	72,612	....	....	2,456	....	4,605	....	....	....	....	....	....	....	....	....

*Estimated, and to Aug. 31, 1939, only. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only §Up to July 31, 1939, only. aUp to Sept. 30, 1939. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total
1938 ..	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	3,100	5,900*	15,300	2,800	894,900
1939 ..	376,755	372,046	61,028	9,241	6,616	11,864	24,014	41,753	65,219	968,536	2,079*	5,435	2,824	6,600*	16,094	2,861	1,004,429
1940																	
Jan. ..	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	185	1,191	147	600	1,550	389	108,883
Feb. ..	45,651	37,958	8,946	2,030	892	1,164	2,678	4,307	6,931	110,557	94	477	234	600	1,662	239	113,863
Mar. ..	47,885	42,355	5,305	1,070	871	1,050	3,536	3,111	3,551	108,734	178	548	343	600	1,482	346	112,221
Apr. ..	25,454	44,416	4,144	817	990	1,799	2,951	1,834	2,927	85,332	203	598	120	600	1,159	314†	88,326
May ..	57,874	40,436	7,337	972	1,046	1,370	2,696	2,582	4,578	118,891	195	364	361	600	2,305	288†	123,004
June ..	45,471	44,834	5,603	841	712	1,421	4,077	2,178	2,730	107,867	168	405	200*	600	1,080	365†	110,685
July ..	42,861	60,493	7,330	1,257*	310	1,767	2,494	4,253	4,045	124,810	163	342	200*	600	1,055	262†	127,412
Aug. ..	45,872	45,045	8,137	1,257*	75	1,593	2,640	4,545	7,337	116,501	200*	600*	200*	600	1,233	327†	119,661
Sept. ..	58,892	44,009	9,985	1,258*	61	1,743	2,404	3,247	9,303	130,902	100*	600*	200*	600	1,250*	200*	133,852

* Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Financial

(*Continued from page* 68)

General Motors Corp., Detroit, Mich., September quarter: consolidated net income, $15,597,030, equal, after preferred dividend requirements, charges, taxes and reserves, to 31¢ each on 43,165,393 common shares, against $8,627,268, or 15¢ a share, in the same quarter last year. Nine months ended September 30: consolidated net income, $129,172,490, or $2.83 a common share, against $109,619,799, or $2.39 a share, in the similar period of 1939.

Monsanto Chemical Co., St. Louis, Mo., and American subsidiaries. Third quarter, 1940: net income, after all charges including greatly increased tax assessments, $469,031, equal, after provision for preferred dividends and the minority interest in an American subsidiary, to 28¢ a share on the 1,241,694 common shares outstanding, against $1,192,219, or 85¢ a share on 1,241,712 shares, for the September, 1939, quarter. First nine months of 1940: net operating earnings, exclusive of a $270,375 dividend from the British subsidiary, $3,576,757, equal, after provision for preferred dividends and the minority interest, to $2.58 a common share, against $3,253,284, or $2.31 a share, in the corresponding period last year.

New Jersey Zinc Co., New York, N. Y. First nine months of 1940: net profit, $5,114,464, after all charges, equal to $2.60 a share on 1,963,264 shares, against $3,507,939, or $1.78 a share, in the first nine months of 1939. September quarter: net profit, $1,796,195, or 91¢ a share, against $1,553,156, or 79¢ a share, in the June quarter and $1,460,290 or 74¢ a share in the third quarter last year.

Norwalk Tire & Rubber Co., Norwalk, Conn. Year ended September 30: net loss, $52,714, against net profit of $180,593 in the preceding fiscal year.

Raybestos-Manhattan, Inc., Passaic, N. J., and subsidiaries. Nine months to September 30: net profit, $1,359,622, after excess profits taxes, equal to $2.16 a share on 628,100 shares, but net does not include earnings of wholly-owned Canadian subsidiary. For the nine months of 1939 the company and its subsidiaries, including the Canadian one, reported net profit of $1,069,927 or $1.69 a share on 631,200 shares.

Rome Cable Corp., Rome, N. Y. September quarter: net profit, subject to audit, $100,755, equal to 53¢ each on 189,830 capital shares, against $60,570, or 32¢ a share, in the second quarter and $69,090, or 36¢ a share in the third quarter of 1939. Six months to September 30; net profit, $161,325, or 85¢ a share, against $115,083, or 60¢ a share, for six months to September 30, 1939.

Skelly Oil Co., Tulsa, Okla., and subsidiaries. September quarter: net income, $706,943, after provision for income taxes and other charges, but excluding excess profits tax, if any, equal, after preferred dividend requirements, to 71¢ each on 995,349 common shares outstanding, against $609,327, or 52¢ a share, in the same period last year. Nine months ended September 30: net income, $2,251,905, or $2.13 a share, against $1,366,246, or $1.08 a share in the first nine months of 1939. Year ended September 30: net profit, $3,246,442, or $3.04 a share, against $2,042,878, or $1.67 a share, for the preceding year.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940			
Jan.	15,018	5,044	6,389
Feb.	15,319	5,062	4,761
Mar.	15,656	4,879	4,532
Apr.	16,881	5,128	3,902
May	18,095	5,075	3,862
June	18,886	4,528	3,737
July	17,641	3,323	4,567
Aug.	16,386	4,583	5,808
Sept.	14,232	4,046	6,200

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business,* Bureau of Foreign & Domestic Commerce, Washington, D. C.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

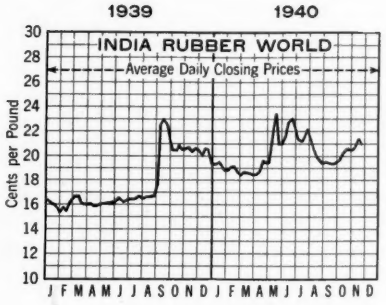
Futures	Sept. 28	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23
			"New" Standard			
Nov.	19.52	20.32	20.35	20.90	20.90	20.72
Dec.	19.49	20.30	20.30	20.85	20.85	20.67
Mar.	19.32	19.94	19.98	20.50	20.40	20.30
July	19.10	19.60	19.65	20.10	20.02	19.90
Sept.	.....	19.55	19.55	20.05	19.87	19.75
Oct.	.....	.....	.....	19.50	20.00	19.82	19.70
			No. 1 Standard			
Nov.	19.52	20.32	20.35	20.85	20.85	20.67
Dec.	19.49	20.30	20.30	20.80	20.80	20.62
Mar.	19.32	19.94	19.98	20.45	20.40	20.30
May	19.20	19.75	19.75	20.33	20.20	20.10
Volume (tons) per week "New" Standard	430	30	280	570	380	280
No. 1 Standard	4,200	1,940	2,320	3,540	3,880	4,950

INTEREST in the rubber futures market, which further strengthened during the past month, centered about activities of the International Rubber Regulation Committee, high U. S. consumption figures, and reports of a growing shortage of available shipping space. Political and military developments in the Far East also continued to be watched closely by trade interests. After closing at 20.45¢ per pound on October 31, December futures (old contract) advanced sharply to reach 21.05¢ per pound on December 15. After mid-month, prices were easier, and the December position dropped to close at 20.62¢ per pound on November 23. Thereafter the market was weaker, and the closing price on November 28 was 20.48¢ per pound. Trading during the month was moderately active, with the bulk of the volume still confined to the old contract.

October consumption of rubber in this country at 56,477 long tons was the second highest on record, exceeded only by the October, 1939, figure of 57,155 tons. If November and December consumption averages above 50,000 tons, as is expected, total consumption for 1940 will reach a record high of more than 600,000 tons. Meanwhile heavy shipments of rubber are on their way to this country, as reflected in record high afloats of 166,837 long tons, as of October 31. Likewise domestic stocks increased to 259,140 long tons (including 57,131 long tons of government held rubber) at the end of October. World absorption of rubber during September, as reported by the International Rubber Regulation Committee, was 81,706 long tons, which compares with 78,977 long tons in August and 87,353 long tons in September, 1939.

According to a report to the Department of Commerce from Singapore, buyers there have had difficulty in finding rubber for nearby shipment. However Malaya is expected to be able to produce 90% of its basic quota without trouble, and unless the I. R. R. C. makes further increases in permissibles, large areas of native rubber are expected to remain out-of-tap. The Japanese were reported to have been heavy buyers in Netherland India.

A meeting of the International Rubber Regulation Committee scheduled in London for November 19 was postponed to November 22 to await the arrival of Sir John Hay from the United States so that he could acquaint the committee with U. S. rubber requirements. As Sir John's arrival in London was delayed again, no action was taken by the committee on 1941 export quotas on November 22. However, the I. R. R. C., in order to speed up rubber shipments, further suggested to signatory governments that arrangements be made for the issuance of 1941 export licenses as soon as the percentage of basic quotas is fixed, thus permitting shipment before the end of 1940. On November 28, the committee raised the export quota for the first quarter of 1941 to 100% of basic quotas against the current rate of 90%. Total first quarter permissibles, including Thailand and Indo-China, will be 403,675 tons, or 134,558 tons monthly.



New York Outside Market—Spot Ribbed Smoked Sheets

New York Outside Market Rubber Quotations

Latex	Nov. 27, 1939	Oct. 28, 1940	Nov. 27, 1940
Normal, 38-40%, *gal.*	$0.80/0.81	$0.78/0.79	$0.79/0.80
Centrifuged, 60-63% ....*gal.*	.. ..	1.35/1.36	1.35/1.36
Paras			
Upriver fine....*lb.*	.18¼	.16¾	.17
Upriver fine....*lb.*	*.21¼	*.19¾	*.20¼
Upriver coarse.*lb.*	.11	.11½	.11½
Upriver coarse.*lb.*	*.19	*.17	*.17¼
Islands fine....*lb.*	.18	.16	.16¾
Islands fine....*lb.*	*.21	*.19	*.19¾
Acre, Bolivian fine .....*lb.*	.18	.17	.17¼
Acre, Bolivian fine .....*lb.*	*.21½	*.20	*.20½
Beni, Bolivian fine .....*lb.*	.18½	.18	.18½
Madeira fine...*lb.*	.18¼	.16¾	.17
Caucho			
Upper ball.....*lb.*	.11	.11½	.11½
Upper ball.....*lb.*	*.19	*.17	*.17¼
Lower ball.....*lb.*	.10	.10½	.11
Pontianak			
Pressed block..*lb.*	.12/.18	.15/.20	.12/.22
Guayule			
Ampar .....*lb.*	.15	.15½	.15½
Africans			
Rio Nuñez ..*lb.*	.17½	.18½	.18½
Black Kassai...*lb.*	.17½	.18½	.19
Prime Niger flake .....*lb.*	.25	.22½	.22½
Gutta Percha			
Gutta Siak ....*lb.*	.17	.16	.18
Gutta Soh .....*lb.*	.17	.24	.25
Red Macassar..*lb.*	1.20	1.20	1.20
Balata			
Block Ciudad Bolivar .....*lb.*	.35	.45	.42
Manaos block..*lb.*	.33	.50	.45
Surinam sheets.*lb.*	.40	.47	.54
Amber .....*lb.*	.42	.49	.56

* Washed and dried crepe. Shipments from Brazil.

New York Outside Market

Activity in the actual market was moderate during the past month, but below that of October. Factories bought quite steadily throughout the month, but shipment business was slow, with offerings from the Far East scarce and generally too high. The market ruled strong, and the price of No. 1-X ribbed smoked sheets, after closing at 20⅝¢ per pound on October 31, advanced sharply to 21½¢ per pound on November 13 and then became easier, to close at 21¢ per pound on November 23. The closing price on November 28 was 21¢ per pound with the market steady.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	October, 1940				November, 1940																		
	28	29	30	31	1	2	4	5†	6	7	8	9	11†	12	13	14	15	16	18	19	20	21†	22	23
No. 1-X R.S.S. in cases*..	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	..	20⅝	20¾	20⅞	21⅛	..	21⅛	21¼	21¼	21¼	21⅜	21¼	21⅛	21	..	21	21
No. 1 Thin Latex Crepe.....	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	..	20⅝	20¾	20⅞	21⅛	..	21⅛	21¼	21¼	21¼	21⅜	21¼	21⅛	21	..	21	21
No. 2 Thick Latex Crepe....	20¾	20¾	20¾	20¾	20¾	20¾	20⅝	..	20⅝	20¾	20⅞	21⅛	..	21⅛	21¾	21¼	21¼	21⅜	21¼	21⅛	21	..	21	21
No. 1 Brown Crepe.....	19⅛	19⅛	19¼	19¼	19⅛	19⅛	19⅛	..	19⅛	19¼	19⅜	19⅝	..	19⅝	19⅝	19⅝	19⅝	19½	19⅜	19¼	19⅛	..	19⅛	19⅛
No. 2 Brown Crepe.....	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	..	18⅞	19	19⅛	19⅜	..	19⅜	19⅜	19⅜	19⅜	19¼	19⅛	19	18⅞	..	18⅞	18⅞
No. 2 Amber.....	19¼	19¼	19¼	19⅛	19⅛	19⅛	19⅛	..	19⅛	19¼	19⅜	19⅝	..	19⅝	19⅝	19⅝	19⅝	19½	19⅜	19¼	19⅛	..	19⅛	19⅛
No. 3 Amber.....	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	..	18⅞	19	19⅛	19⅜	..	19⅜	19⅜	19⅜	19⅜	19¼	19⅛	19	18⅞	..	18⅞	18¾
Rolled Brown.....	15½	15½	15½	15½	15½	15½	15½	..	15½	15⅝	15¾	16	..	16	16	16	16	15¾	15¾	15¾	15½	..	15½	15½

*No. 1 Ribbed Smoked Sheets are ⅛¢ lower than No. 1-X R.S.S. in cases quoted here. †Holiday.

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, October reclaimed rubber consumption is estimated at 16,528 long tons, 13.3% above that of September; production, 19,358 long tons; and stocks on hand October 31 at 32,118 long tons. Consumption during November was reported to be holding up well, with tires, footwear, insulated wire, and mechanicals as active consuming outlets for reclaim. The demand is expected to continue at a good level during December and into the first quarter of next year.

The market is steady, and all grades of reclaim continue at last month's levels.

New York Quotations

November 25, 1940

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9 / 9¼
Compound	1.10-1.20	9 /10
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U.S. Stocks*†	Exports
1938	122,403	120,800	27.6	23,000	7,403
1939	186,000	170,000	28.7	25,250	12,611
1940					
Jan.	19,297	16,070	29.2	27,418	1,059
Feb.	17,992	15,370	30.8	28,602	1,436
Mar.	17,234	15,931	31.7	28,488	1,420
Apr.	16,568	16,298	32.5	27,558	977
May	17,552	15,719	30.5	28,397	866
June	16,631	14,912	32.1	29,260	1,207
July	14,342	14,298	30.4	28,058	1,232
Aug.	17,213	14,224	28.3	29,786	1,300
Sept.	16,428	14,589	29.1	30,287	1,031
Oct.	19,358	16,528	29.3	32,118	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡¶
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,105,002	646,252
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,900	942,252	596,498
1939	499,616	592,000	125,800	91,095	44,917*a*	15,299	1,004,429	1,110,358	447,666*a*
1940									
Jan	72,520	54,978	142,368*b*	90,285*b*	.....	35,928	108,883	105,998	.....
Feb.	43,088	49,832	134,328*b*	112,257*b*	.....	33,563	113,863	96,681	.....
Mar.	59,277	50,192	142,414*b*	113,619*b*	.....	23,830	112,221	102,356	.....
Apr.	70,690	50,103	162,459*b*	102,557*b*	.....	42,239	88,326	100,418	.....
May	51,431	51,619	161,446*b*	109,364*b*	.....	32,731	123,004	94,933	.....
June	53,889	46,506	168,235*b*	119,138*b*	.....	32,375	110,685	78,594	.....
July	69,596	47,011	190,222*b*	139,629*b*	.....	36,716	127,412	75,639	.....
Aug.	73,028	50,234	213,002*b*	141,286*b*	.....	40,425	119,661	80,022	.....
Sept.	78,973	50,206	241,358*b*	137,033*b*	.....	29,069	133,852	82,751	.....
Oct.	74,696	56,477	259,140*b*	166,837*b*	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* ¶Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a.* Stocks as of Aug. 31, 1939. *b.* Includes government emergency rubber.

THE Rubber Manufacturers Association, Inc., estimated that United States rubber manufacturers consumed 56,477 long tons of crude rubber during October, the second highest month's consumption on record; the previous high was in October, 1939, when 57,155 long tons were consumed. October's consumption was above the September consumption of 50,206 long tons, but 1.2% below that of October, 1939.

Gross imports for October, as reported by the Department of Commerce, were 74,696 long tons, 5.4% under the record September figure of 78,973 long tons, but 63.7% over the 45,628 long tons imported in October, 1939.

Total domestic stocks, including government-held rubber, are estimated by the R. M. A. on October 31 to be 259,140 long tons, 7.4% over the 241,358 long tons for September 30 and 117% over the 119,404 (revised) long tons on hand October 31, 1939.

The Department of Commerce reported that stocks of cotton-rubber barter rubber and of the Rubber Reserve Co. totaled 57,131 long tons the end of October.

Crude rubber afloat to U. S. ports on October 31 is estimated at 166,837 long tons, greater by more than 25,000 long tons than the previous high reached in August, 1940. Comparative figures for September, 1940, and October, 1939, are 137,033 long tons and 100,500 long tons, respectively.

RUBBER SCRAP

THE demand for scrap rubber during November continued active, with reclaim production at a high level. Japan was reported to be buying large quantities of scrap rubber here. Of a total of 8,557,550 pounds of scrap exported from this country in September, 5,999,609 pounds went to Japan, according to Department of Commerce figures. The market continued firm, and several grades of scrap rubber (red and mixed tubes, mixed black scrap, air brake hose, and red mechanical grades) advanced in price. Other grades remain unchanged at previous levels.

Consumers' Buying Prices

(Carlot Lots for November 22, 1940)

		Prices
Boots and Shoes		
Boots and shoes, black	*lb.*	$0.01³/₁₀/$0.01⅓
Colored	*lb.*	.00⅞/ .01
Untrimmed arctics	*lb.*	.00⅞/ .01
Inner Tubes		
No. 1, floating	*lb.*	.11 / .12
No. 2, compound	*lb.*	.04¾/ .04⅞
Red	*lb.*	.04¾/ .04⅞
Mixed tubes	*lb.*	.04⅛/ .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	15.00 /15.50
Beadless	*ton*	18.50 /19.00
Auto tire carcass	*ton*	38.00 /44.00
Black auto peelings	*ton*	42.00 /44.00
Solid		
Clean mixed truck	*ton*	32.00 /34.00
Light gravity	*ton*	42.00 /44.00
Mechanicals		
Mixed black scrap	*ton*	24.00 /26.00
Hose, air brake	*ton*	22.00 /24.00
Garden, rubber covered	*ton*	12.00 /14.00
Steam and water, soft	*ton*	12.00 /14.00
No. 1 red	*lb.*	.03⅛/ .03¼
No. 2 red	*lb.*	.02½/ .02¾
White druggists' sundries	*lb.*	.03¼/ .04
Mixed mechanicals	*lb.*	.02¼/ .02½
White mechanicals	*lb.*	.03¾/ .04
Hard Rubber		
No. 1 hard rubber	*lb.*	.11½/ .13

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2807	Manufacturers of machinery to make rubber-soled canvas shoes.
2808	Manufacturers of rubber bottle stoppers.
2809	Manufacturers of machines for making rubber thread.
2810	Manufacturers of rubber bands ¼-inch by four inches by five feet with loops on both ends.
2811	Manufacturer of Rubber-Tex.
2812	Manufacturer of Para-Mold.
2813	Manufacturer of Rubber-Spray.
2814	Supplier of the pigment "Calcobright."
2815	Manufacturers of equipment for making door mats from used tires.
2816	Manufacturers of sponge rubber mats for gymnasium foot tubs.

COMPOUNDING INGREDIENTS

ACTIVITY in the compounding ingredients market during November held generally to the high level of the previous month. The outlook for the future is favorable, with indications that rubber manufacturing activity, bolstered by defense orders, will show no marked falling off, at least through the first quarter of 1941.

CARBON BLACK. The demand from the rubber industry continued at a good pace during November, with consumption approximately equivalent to production of black. Industry stocks are reported to be sufficient to provide for any peaks in demand that may occur. Prices are firm and unchanged.

FACTICE OR RUBBER SUBSTITUTE. The demand was reported to be very good, with prices steady.

LITHARGE. Carlot prices were advanced 0.3¢ per pound and less than carlot, 0.25¢. The demand was active.

LITHOPONE. Deliveries continued at a good level, and prices are firm and unchanged.

RUBBER CHEMICALS. The demand for accelerators and antioxidants was reported to be active and at a somewhat higher level than that of October. Prices are generally steady.

RUBBER SOLVENTS. Tire makers continued active buyers of these solvents. Prices are steady.

TITANIUM PIGMENTS. Movement into consumption continued heavy, and prices are unchanged.

ZINC OXIDE. Volume moving to the rubber industry held at a good level. Prices are firm.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.03 / $.035
Rottenstone, domestic	lb.	.03 / .035
Silica, 15	ton	

Accelerators, Inorganic

Lime, hydrated, *l.c.l., New York*	ton	20.00
Litharge (commercial)	lb.	.075

Accelerators, Organic

A-1	lb.	.24 / .30
A-10	lb.	.31 / .35
A-11	lb.	.52 / .65
A-19	lb.	.52 / .65
A-32	lb.	.70 / .80
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	.40 / .42
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.55 / .60
B-J-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Eight	lb.	.98 / 1.00
Zimate	lb.	2.50
C-P-B		2.00
Captax	lb.	.50 / .55
Crylene	lb.	.40 / .47
Paste	lb.	.30 / .36
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.60 / .70
DOTG (Di-ortho-tolyguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.35 / .45
El-Sixty	lb.	.50 / .65
Ethylideneaniline	lb.	.42 / .43
Ethyl Zimate	lb.	2.50
Formaldehyde P.A.C.	lb.	.06
Formaldehydeaniline	lb.	$0.31
Formaldehyde-para-toluidine	lb.	.52 /$0.54
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.13
Witco	lb.	.15
Ledate	lb.	2.35
Monex	lb.	2.35
Novex	lb.	
O-N-V	lb.	1.00 / 1.10
O-X-A-F	lb.	.50 / .55
Ovac	lb.	.50 / .55
Oxynone	lb.	.64 / .80
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	1.00 / 1.10
Flour	lb.	.15 / .16
Phenex	lb.	.50 / .55
Pip-Pip	lb.	2.50
Pipsolene	lb.	1.55 / 1.85
R-2	lb.	1.40 / 1.80
R-23	lb.	.40
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.60 / .65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Selenac	lb.	2.75
SPDX	lb.	.70 / .75
A	lb.	.70 / .75
Super-sulphur No. 1	lb.	.50
2	lb.	.18 / .20
Tetrone A	lb.	2.70
Thiocarbanilide	lb.	.24 / .30
Thionex	lb.	2.35
Thiurad	lb.	2.35
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads	lb.	2.35
Ulto	lb.	1.25 / 1.75
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb.	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Zenite	lb.	.46 / .48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate	lb.	2.35

Activators

Aero Ac 50	lb.	.46 / .56
Barak	lb.	.50
MODX	lb.	.30 / .35
SL No. 10	lb.	.12

Age Resisters

AgeRite Alba	lb.	1.50 / 1.65
Exel	lb.	1.00 / 1.02
Gel	lb.	.57 / .59
Hipar	lb.	.65 / .67
Powder	lb.	.52 / .54
AgeRite Resin	lb.	.52 / .54
D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Akroflex C	lb.	.56 / .58
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.52 / .61
Copper Inhibitor X-872-A	lb.	1.15
Flectol B	lb.	.52 / .65
H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.64 / .80
Parazone	lb.	.68
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
BX	lb.	.58 / .71
Santovar A	lb.	1.15 / 1.40
Solux	lb.	1.30
Stabilite	lb.	.52 / .54
Alba	lb.	.70 / .75
Thermoflex A	lb.	.65 / .67
Tysonite	lb.	.16
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700-*lb. drums*)	100 lbs.	2.30 / 3.15

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing all known ingredients. Requests for information not recorded will receive prompt attention.

Antiscorch Materials

A-F-B	lb.	$0.35 /$0.40
Antiscorch T	lb.	.90
Cumar RH	lb.	.10
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.10
RM	lb.	1.25
Retarder W	lb.	.36
Retardex	lb.	.45 / .48
U-T-B	lb.	.35 / .40

Antisun Materials

Heliozone	lb.	.22 / .23
S.C.R.	lb.	.33 / .35
Sunproof	lb.	.22 / .27

Brake Lining Saturant

B.R.T. No. 3	lb.	.0165/ .0175

Colors

Black

Du Pont powder	lb.	.42 / .44
Lampblack (commercial), *l.c.l.*	lb.	.15

Blue

Brilliant	lb.	
Du Pont dispersed	lb.	.83 / 3.95
Powders	lb.	2.25 / 3.75
Toners	lb.	.08 / 3.85

Brown

Mapico	lb.	.11

Green

Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	.22
oxide (*freight allowed*)	lb.	
Dark	lb.	
Du Pont dispersed	lb.	.98 / 1.75
Powders	lb.	1.00 / 3.50
Guignet's (*bbls.*)	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.75

Orange

Du Pont dispersed	lb.	.88 / .98
Powders	lb.	.88 / 2.75
Lake	lb.	
Toners	lb.	.40 / 1.60

Orchid

Toners	lb.	1.50 / 2.00

Pink

Toners	lb.	1.50 / 2.00

Purple

Permanent	lb.	
Toners	lb.	.60 / 2.10

Red

Antimony Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	
R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.23
Cadmium, light (400-*lb. bbls.*)	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Du Pont dispersed	lb.	.93 / 2.05
Powders	lb.	.285 / .90
Mapico	lb.	.0925
Medium	lb.	
Rub-Er-Red (*bbls.*)	lb.	.0925
Scarlet	lb.	.08 / 2.00
Toners	lb.	.08 / 2.00

White

Lithopone (*bags*)	lb.	.0360/ .0385
Albalith	lb.	.0360/ .0385
Astrolith (50-*lb. bags*)	lb.	.0360/ .0385
Azolith	lb.	.0360/ .0385
Titanium Pigments		
Ray-Bar	lb.	.0525/ .0575
Ray-Cal	lb.	.05 / .0525
Rayox	lb.	.13
Titanolith (50-*lb. bags*)	lb.	.05 / .0525
Titanox-A (50-*lb. bags*)	lb.	.13 / .1375
B (50-*lb. bags*)	lb.	.0525/ .0550
30 (50-*lb. bags*)	lb.	.0525/ .0550
C (50-*lb. bags*)	lb.	.05 / .0525
M (50-*lb. bags*)	lb.	.0525/ .0550
Ti-Tone	lb.	
Zopaque (50-*lb. bags*)	lb.	.13 / .1375
Zinc Oxide		
Azo ZZZ-11	lb.	.065 / .0675
44	lb.	.065 / .0675
55	lb.	.065 / .0675
66	lb.	.065 / .0675
French Process, Florence Green Seal-8	lb.	.0825/ .0850
Red Seal-9	lb.	.0775/ .08
White Seal-7	lb.	.0875/ .09
Kadox, Black Label-15	lb.	.065 / .0675
No. 25	lb.	.0775/ .08
Red Label-17	lb.	.065 / .0675

White (Cont'd)

Zinc Oxide (*Cont'd*)

Horse Head Special 3	lb.	$0.065	/$0.0675
XX Red-4	lb.	.065 /	.0675
23	lb.	.065 /	.0675
72	lb.	.065 /	.0675
78	lb.	.065 /	.0675
80	lb.	.065 /	.0675
103	lb.	.065 /	.0675
110	lb.	.065 /	.0675
St. Joe (lead free)			
Black Label	lb.	.065 /	.0675
Green Label	lb.	.065 /	.0675
Red Label	lb.	.065 /	.0675
U.S.P.	lb.	.0975/	.10
Zinc Sulphide Pigments			
Cryptone-BA-19	lb.	.05 /	.0525
BT	lb.	.05 /	.0525
CB	lb.	.05 /	.0525
MS	lb	.0525/	.055
ZS No. 20	lb.	.075 /	.0775
86	lb.	.075 /	.0775
230	lb.	.075 /	.0775
800	lb.		
Sunolith	lb.	.0360/	.0385

Yellow

Cadmolith (cadmium yellow), (400-lb. bbls.)	lb.	.50 /	.55
Du Pont dispersed	lb.	1.25 /	1.75
Powders	lb.	.135 /	2.75
Lemon	lb.		
Mapico	lb.	.0675	
Toners	lb.	2.50	

Dispersing Agents

Bardex	lb.	.0395/	.042
Bardol	lb.	.0225/	.025
Darvan	lb.	.30 /	.39
Nevoll (*drums, c.l.*)	lb.	.0225	
Santomerse S	lb.	.11 /	.25

Fillers, Inert

Asbestine, *c.l.*	ton	15.00	
Barytes	ton	30.00	/36.00
f.o.b., St. Louis (50-lb. paper bags)	ton	22.85	
off color, domestic	ton	21.50	/26.50
white, imported	ton		
Blanc fixe, dry, precip.	lb.	.03 /	.035
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.025 /	.03
Kalite No. 1	ton	24.00	/30.00
3	ton	34.00	/40.00
Kalvan	ton	121.00	
Magnesia, calcined, heavy	lb.	.04	
Carbonate, *l.c.l.*	lb.	.0725/	.095
Paradene No. 2 (*drums*)	lb.	.045	
Pyrax A	ton	6.00	/20.00
Vinsol Resin	lb.		
Whiting			
Columbia Filler	ton	9.00	/14.00
Suprex, white extra light	ton	45.00	
heavy	ton	45.00	
Witco, *c.l.*	ton	6.00	

Finishes

Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd. 100 lbs.			
potato	lb.		
Talc	ton	.025 /	.035

Flock

Cotton flock, dark	lb.	.10 /	.12
dyed	lb.	.40 /	.70
white	lb.	.11 /	.19
Rayon flock, colored	lb.	1.00 /	2.00
white	lb.	.75 /	1.00

Latex Compounding Ingredients

Accelerator 85	lb.	.35	
89	lb.	1.40	
122	lb.	1.55	
552	lb.	2.50	
Aerosol OT Aqueous 10%	lb.	.15 /	.175
Antox, dispersed	lb.	.42	
Aquarex A	lb.	.35	
D	lb.	.75	
F	lb.	.85	
WA Paste	lb.	.28	
Areskap No. 50	lb.	.18 /	.24
100, dry	lb.	.39 /	.51
Aresket No. 240	lb.	.16 /	.22
300, dry	lb.	.42 /	.50
Aresklene No. 375	lb.	.35 /	.50
400, dry	lb.	.51 /	.65
Black No. 25, dispersed	lb.	.22 /	.40
Collocarb	lb.	.07	
Color Pastes, dispersed	lb.	.35 /	1.90
Compound G-11 NW	lb.		
Dispersex No. 15	lb.	.11 /	.12
No. 20	lb.	.08 /	.10
Emo, brown	lb.	.16	
white	lb.	.16	
Factice Compound, dispersed	lb.	.19	
Factex Dispersion A	lb.		
Heliozone, dispersed	lb.	.25	
Igepon A	lb.		
Latac	lb.		
MICRONEX, Colloidal	lb.	.055 /	.065
Nekal BX (dry)	lb.		
Pipsol X	lb.	3.05 /	3.55
R-2 Crystals	lb	2.50 /	2.75
R-23	lb.	$0.40	
RN-2	lb.	2.00	/$2.25
Crystals	lb.	2.00 /	2.25
S-1 (400-lb. drums)	lb.	.65	
Santobrite Briquettes	lb.	.17 /	.26
Powder	lb.	.16 /	.26
Santomerse D	lb.	.41 /	.65
S	lb.	.11 /	.25
No. 1	lb.	.18 /	.35
No. 2	lb.	.18 /	.35
No. 3	lb.	.40 /	.65
No. 3P	lb.	.29 /	.45
Stablex A	lb.	.90 /	1.10
B	lb.	.65 /	.90
C	lb.	.40 /	.50
Sulphur, dispersed	lb.	.10 /	.15
No. 2	lb.	.075	
T-1 (400-lb. drums)	lb.	.40	
Tepidone	lb.	1.20	
Vulcan Colors	lb.		
Zinc oxide, dispersed	lb.	.12 /	.15

Mineral Rubber

Black Diamond	ton	25.00	
B.R.C. No. 20	lb.	.009 /	.01
Hydrocarbon, hard	ton	23.00	
Genasco Hydrocarbon, granulated	ton		
solid	ton		
Gilsonite	ton		
Parmr	ton	23.00	/27.00
Pioneer	ton		
285°-300°	ton	23.00	/42.00

Mold Lubricants

Lubrex	lb.	.25 /	.30
Mold Paste	lb.	.12 /	.18
Sericite	ton	65.00	/75.00
Soapbark	lb.		
Soapstone, *l.c.l.*	ton	25.00	/35.00

Oil Resistant

AXF	lb.	.40 /	.50

Reclaiming Oils

B.R.V.	lb.	.032 /	.0345
No. 1621	lb.	.019 /	.02
S.R.O.	lb.	.019 /	.02
X-159	gal.	.20	

Reenforcers

Carbon Black			
Aerfloted Arrow Specification (*bags only*)	lb.	.02925†	
Arrow Compact Granulized	lb.	.02925†	
Certified Heavy Compressed (*bags only*)	lb.	.02925†	
Spheron	lb.	.02925†	
Continental, dustless	lb.	.02925†	
Compressed (*bags only*)	lb.	.02925†	
Disperso	lb.	.02925†	
Dixie	lb.	.02925†	
Dixiedensed	lb.	.02925†	
66	lb.	.02925†	
Excello, dustless	lb.	.02925†	
Fumonex	lb.	.03	
Gastex	lb.	.03 /	.07
Kosmobile	lb.	.02925†	
66	lb.	.02925†	
Kosmos	lb.	.02925†	
MICRONEX Beads	lb.	.02925†	
Mark II	lb.	.02925†	
Standard	lb.	.02925†	
W-5	lb.	.02925†	
W-6	lb.	.02925†	
P-33	lb.	.0475 /	.0725
Pelletex	lb.	.03 /	.07
Supreme, dustless	lb.	.02925†	
Thermax	lb.	.02 /	.0475
Velvetex	lb.	.029 /	.034
"WYEX BLACK"	lb.	.02925†	
Carbonex	lb.	.022 /	.035
S	lb.	.03 /	.0350
Clays			
Aerfloted Paragon (50-lb. bags)	ton	10.00	
Suprex (50-lb. bags)	ton	10.00	
Barden	ton	10.00	
Catalpo, *c.l.*	ton	30.00	
Chicora	ton	10.00	
China	ton	22.50	
Crown	ton	10.00	
Dixie	ton	10.00	/22.50
Hi-White	ton	10.00	
Langford	ton	8.50	
NcNamee	ton	10.00	/22.50
Par	ton	10.00	
Paraforce, *c.l.*	ton	40.00	
Witco, *c.l.*	ton	10.00	
Cumar EX	lb.	.045	
MH	lb.	.065 /	.11
V	lb.	.09 /	.12
Silene	lb.	.04 /	.045

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is 2.75¢ per pound; f.o.b. Hoboken (bulk), 3.63¢; f.o.b. No. Atlantic Docks (bags), 3.80¢. All prices are carlot.

Compound G-4	lb.		
G 11	lb.		
Curodex 19	lb.	$2.75	
188	lb.	3.50	
Para-Dors	lb.	4.50	
Rodo No. 0	lb.	3.50	/$4.00
10	lb.	4.50	/ 5.00
198	lb.		

Rubber Substitutes

Black	lb.	.08 /	.12
Brown	lb.	.08 /	.115
White	lb.	.085 /	.13
Factice			
Amberex	lb.	.25	
Type B	lb.	.1875	
Brown	lb.	.08 /	.13
Fac-Cel B	lb.	.135	
C	lb.	.135	
Neophax A	lb.	.09	
B	lb.	.09	
White	lb.	.085 /	.135

Softeners

B.R.T. No. 7	lb.	.0165/	.0175
Bondogen	lb.	.98 /	1.25
Burgundy pitch	lb.	.06	
Cycline oil	gal.	.14 /	.20
Dispersing Oil No. 10	lb.	.0335/	.036
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	lb.	.0265	
Nubalene Resin	lb.	.025	
Nypene Resin	lb.	.016 /	.0165
Palm oil (Witco), *c.l.*	lb.		
Palmol	lb.		
Para Flux	gal.	.17 /	.18
No. 2016	gal.	.15 /	.20
Para Lube	lb	.425 /	.48
Pine tar	gal.		
Plastogen	lb.	.0775/	.10
Plastone	lb.	.27 /	.30
R-19 Resin (*drums*)	lb.	.10	
21 Resin (*drums*)	lb.	.10	
Reogen	lb.	.115 /	.22
Rosin oil, compounded	gal.	.40	
RPA No. 1	lb.	.65	
2	lb.	.65	
3	lb.	.46	
Rubtack	lb.	.10	
Tackol	lb.	.083 /	.18
Tonox	lb.	.52 /	.61
Tonox D	lb.	.75 /	.85
Witco No. 20, *l.c.l.*	gal.	.20	
X-1 resinous oil (*tank car*)	lb.	.01	

Softeners for Hard Rubber Compounding

Resin C. Pitch 45°C. M.P.	lb.	.013 /	.014
60°C. M.P.	lb.	.013 /	.014
75°C. M.P.	lb.	.013 /	.014

Solvents

Beta-Trichlorethane	gal.		
Carbon bisulphide	lb.		
tetrachloride	lb.		
Cosol No. 1	gal.	.25 /	.30
No. 2	gal.	.20 /	.28
No. 3	gal.	.20 /	.28
Industrial 90% benzol (*tank car*)	gal.	.14	
Skellysolve	gal.		

Stabilizers for Cure

Laurex (*bags*)	lb.	.1025/	.1275
Stearex B	lb.	.075 /	.085
Beads	lb.	.075 /	.085
Stearic acid, single pressed	lb.	.075 /	.085
Stearite, c.l.	lb.	.085 /	
Zinc stearate	lb.	.23 /	.25

Synthetic Rubber

Neoprene Type E	lb.	.65	
G	lb.	.70	
GN	lb.		
GW	lb.	.75	
H	lb.	.78	
M	lb.	.65	
Latex Type 57	lb.	.30	
Synthetic 190	lb.	.55	

Tackifier

B.R.H. No. 2	lb.	.017 /	.02
Staybelite	lb.		

Varnish

Shoe	gal.	1.45	

Vulcanizing Ingredients

Sulphur	100 lbs.	2.00	
Chloride (*drums*)	lb.	.035 /	.04
Telloy	lb.	1.75	
Vandex	lb.	1.75	

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	lb.		
2 N.C.	lb.		
3 N.C.	lb.		
2	lb.		
1 Yellow	lb.		
Montan, crude	lb.		

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Sept. 28	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23
Nov.	9.58	9.60	9.65	9.95	....	....
Dec.	9.57	9.54	9.60	9.90	10.03	10.17
Mar.	9.51	9.52	9.58	9.91	10.04	10.17
July	9.14	9.24	9.30	9.70	9.84	9.99
Sept.	....	8.97	8.97	9.44	9.58	9.71
Oct.	....	....	....	8.80	9.31	9.45	8.58

New York Quotations

November 25, 1940

Drills

38-inch 2.00-yard	yd.	$0.12¼
40-inch 3.47-yard		.07⅝
50-inch 1.52-yard		.16¾
52-inch 1.85-yard		.14¾
52-inch 1.90-yard		.13¼/.15⅛
52-inch 2.20-yard		.13¾
52-inch 2.50-yard		.12⅛
59-inch 1.85-yard		.15⅛

Ducks

38-inch 2.00-yard D. F.	yd.	.12½/.13½
40-inch 1.45-yard S. F.		.17⅛
51½-inch 1.35-yard D. F.		.20
72-inch 1.05-yard D. F.		.28⅛
72-inch 17.21-ounce		.32¼

Mechanicals

Hose and belting	lb.	.28

Tennis

52-inch 1.35-yard	yd.	.19⅛

Hollands

Gold Seal and Eagle

20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20
50-inch No. 72		.28

Red Seal and Cardinal

20-inch	yd.	.08½
30-inch		.15¾
40-inch		.17
50-inch		.26

Osnaburgs

40-inch 2.34-yard	yd.	.10⅝
40-inch 2.48-yard		.10
40-inch 2.56-yard		.09¾
40-inch 3.00-yard		.08⅓
40-inch 7-ounce part waste		.08⅞
40-inch 10-ounce part waste		.12¼
37-inch 2.42-yard		.10¼

Raincoat Fabrics

Cotton

Bombazine 60 x 64	yd.	.08½
Plaids 60 x 48		.11½
Surface prints 60 x 64		.12½
Print cloth, 38½-inch, 60 x 64		.05⅜

Sheetings, 40-inch

48 x 48, 2.50-yard	yd.	.08⅜
64 x 68, 3.15-yard		.08¾
56 x 60, 3.60-yard		.07⅓
44 x 40, 4.25-yard		.06

Sheetings, 36-inch

48 x 48, 5.00-yard	yd.	.05⅜
44 x 40, 6.15-yard		.04¼

Tire Fabrics

Bulider

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.29½

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.29
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.28½

Cord Fabrics

23/5/3 Karded peeler, 1/16" cotton	lb.	.30
15/3/3 Karded peeler, 1/16" cotton	lb.	.28
12/4/2 Karded peeler, 1/16" cotton	lb.	.27
23/5/3 Karded peeler, 1¼" cotton	lb.	.35½
23/5/3 Combed Egyptian	lb.	.49

Leno Breaker

8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	

COTTON prices, futures and spot, strengthened considerably during the past month. Contributing to the upward movement were the results of the election which gave evidence that acreage, production, and price policies of the government in regard to cotton will be continued. The advance was further stimulated by the news that the Treasury Department had asked for a big increase in the Federal debt limit. Other factors were the expanding sales of cotton textiles and the resulting higher cloth prices. The New York 1 1/16-inch spot middling price, after closing at 9.84¢ per pound on October 31, moved steadily upward through November to close at 10.32¢ per pound on November 25. Thereafter the market was easier, and the closing price on November 28 was 10.26¢ per pound.

Production of cotton from the crop of 1940 was estimated by the Crop Reporting Board of the Department of Agriculture as of November 1 to be 12,847,000 bales, an increase of 106,000 bales from the forecast of 12,741,000 bales as of October 1.

According to the Bureau of Census, 770,702 bales of cotton were consumed by domestic mills during October, a new high for that month and a record for any month except March, 1937, when 777,000 bales were used. October exports of cotton totaled 194,291 bales, a sharp increase over the 90,555 bales shipped in September.

The world cotton crop for the 1940-1941 season was estimated at approximately 30,500,000 bales, as compared with 28,900,000 bales last season, the Department of Agriculture reported last month. The current Russian crop, second only to this country's, is placed at 4,300,000 bales. Other high estimates are: British India, 4,200,000 bales; Latin American countries (total), 3,240,000 bales; China, 2,200,000 bales; and Egypt, 1,801,000 bales. The U. S. crop in this estimate is based on the October 1 figure of 12,741,000 bales.

While exact figures on shipments of barter cotton to England are not available, it is believed that about 350,000 bales of the 690,000 total have been shipped through October.

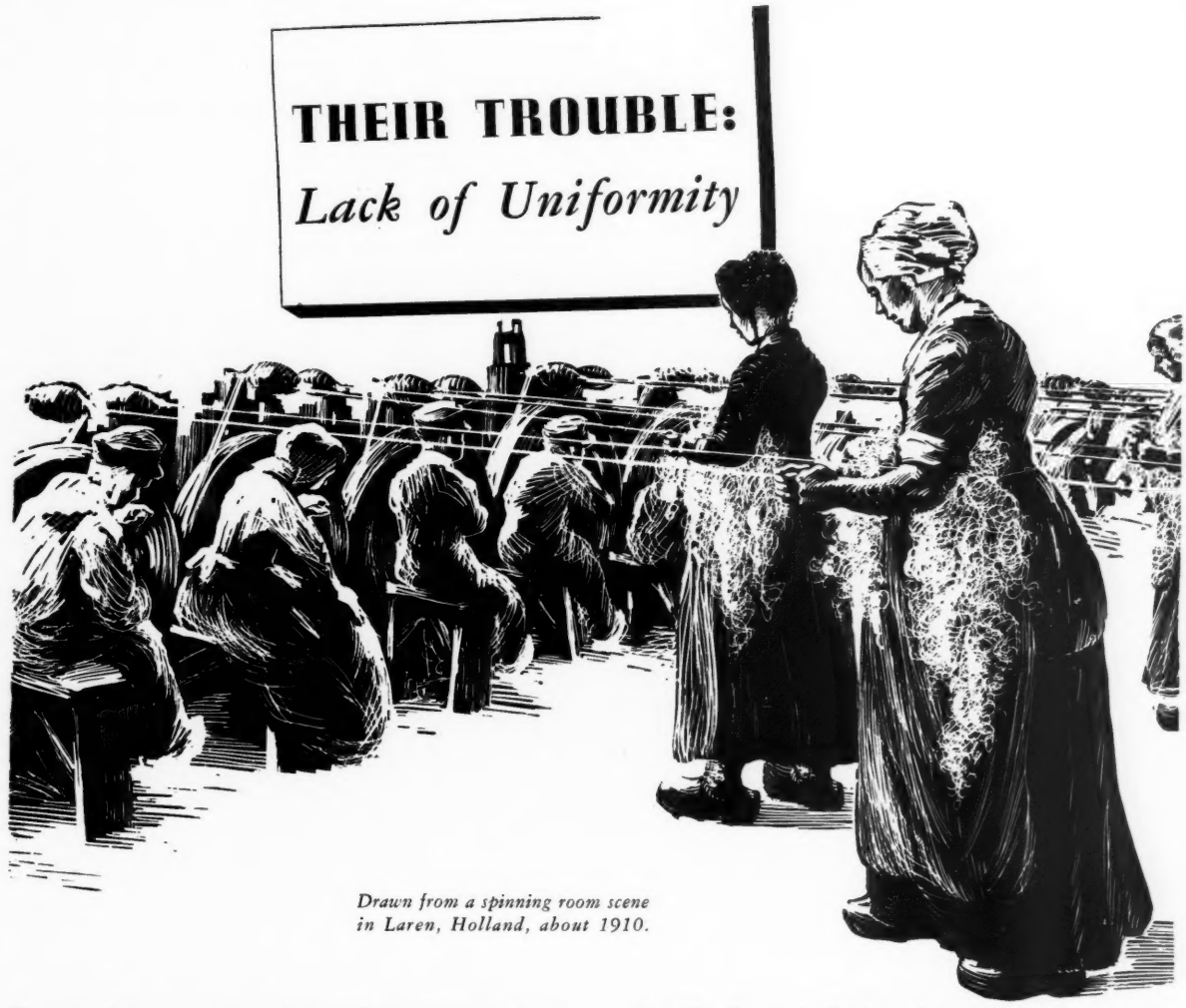
Secretary of Agriculture Claude R. Wickard told members of the Arkansas Farm Bureau that the government could not continue to impound cotton surpluses indefinitely and pointed out that at the end of this season about 12,000,000 bales will be held by the government. The various possible means to cut down this surplus—reduced acreage and increased domestic consumption—were discussed by Mr. Wickard, who also pointed out the possibility that our foreign markets may not be regained immediately after the war has been ended.

Fabrics

Activity in the fabrics market reached such a peak during the early part of October that the possibility of obtaining deliveries seemed to be a more dominant factor than prices asked. A number of mills sold all their production through February and some up to early April. Others withdrew from the market in anticipation of heavier government demand upon their output. Rubberizing types of fabrics have also experienced a sharp increase in demand. The sheeting market has been moderately active with increased demand from the government for defense needs. Raincoat manufacturers and retailers are reported to be doing a good business in all types of raincoats. Prices of all fabrics quoted here, with the exception of two types of raincoat fabrics, which declined slightly, and hollands, which held steady, advanced over last month's quotations. The opinion that further advances are in order is quite general throughout the trade.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co., Inc.	"A" & "B"	$1.00	Dec. 20	Dec. 5
Belden Mfg. Co.	Com.	$0.35 irreg.	Dec. 2	Nov. 22
Brunswick-Balke Collender Co.	Com.	$1.25	Dec. 16	Dec. 5
Brunswick-Balke Collender Co.	Pfd.	$1.25 q.	Jan. 2	Dec. 20
Collins & Aikman Corp.	Com.	$0.25	Dec. 2	Nov. 19
Collins & Aikman Corp.	Pfd.	$1.25 q.	Dec. 2	Nov. 19
Crown Cork & Seal Co., Inc.	Pfd.	$0.5625 q.	Dec. 16	Nov. 29
Dewey & Almy Chemical Co.	Com.	$0.25	Dec. 16	Nov. 30
Dewey & Almy Chemical Co.	"B"	$0.25	Dec. 16	Nov. 30
Dewey & Almy Chemical Co.	Pfd.	$1.25 q.	Dec. 16	Nov. 30
Dominion Textile Co.	Com.	$1.25 q.	Jan. 2	Dec. 14
Dominion Textile Co.	Pfd.	$1.75 q.	Jan. 15	Dec. 31
E. I. du Pont de Nemours & Co., Inc.	Com.	$1.75	Dec. 14	Nov. 25
E. I. du Pont de Nemours & Co., Inc.	Pfd.	$1.125 q.	Jan. 25	Jan. 10
Electric Storage Battery Co.	Com.	$0.50	Dec. 23	Dec. 3
Electric Storage Battery Co.	Pfd.	$0.50	Dec. 23	Dec. 3
Faultless Rubber Co.	Com.	$0.25	Jan. 1	Dec. 16
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Dec. 1	Nov. 15
General Electric Co.	Com.	$0.80	Dec. 20	Nov. 22
General Motors Corp.	Com.	$1.00 irreg.	Dec. 12	Nov. 14
General Motors Corp.	Pfd.	$1.25 q.	Feb. 1	Jan. 6
B. F. Goodrich Co.	Com.	$0.50	Dec. 20	Dec. 6
B. F. Goodrich Co.	$5 Pfd.	$1.25 q.	Dec. 20	Dec. 6
Hewitt Rubber Corp.	Com.	$0.25 q.	Dec. 14	Nov. 30
Intercontinental Rubber Co.	Com.	$0.40	.....	.....
I. B. Kleinert Rubber Co.	Com.	$0.30 irreg.	Dec. 20	Dec. 2
Phelps Dodge Copper Corp.	Com.	$0.75 irreg.	Dec. 10	Nov. 25
Phelps Dodge Copper Corp.	Com.	$0.75	Dec. 10	Nov. 25
Raybestos-Manhattan, Inc.	Com.	$0.75	Dec. 16	Nov. 29
Russell Mfg. Co.	Com.	$0.25	Dec. 16	Nov. 30
Standard Oil Co. of N. J.	Com.	$0.50	Dec. 16	Nov. 15
Standard Oil Co. of N. J.	Com.	$0.25 extra	Dec. 16	Nov. 15
United Elastic Corp.	Com.	$0.15	Dec. 24	Dec. 5
United States Rubber Co.	Pfd.	$2.00	Dec. 20	Dec. 6
Westinghouse Electric & Mfg. Co.	Com.	$1.00 irreg.	Nov. 30	Nov. 8
Westinghouse Electric & Mfg. Co.	Pt. Pfd.	$0.125	Nov. 30	Nov. 8

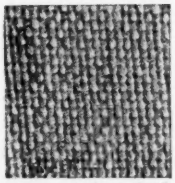


Drawn from a spinning room scene in Laren, Holland, about 1910.

The spinning room scene shown above represents an attempt to apply mass production principles to the spinning of yarn. Keen as they are, the senses of sight and touch cannot be relied upon to produce the uniform yarns which our industrial fabrics require. The scientifically controlled mechanical spinning operations in our 20 modern mills produce yarns that are remarkably uniform in quality, size and degree of twist. This accurate regulation of yarns enables us to produce reliable industrial fabrics year after year.

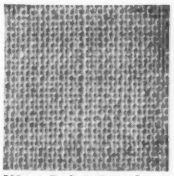
FOR INSTANCE: *Fabrics for the Rubber Industry*

Shawmut Belting Duck

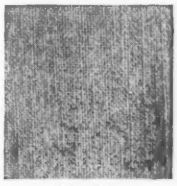


Shawmut Hose Duck

We regularly manufacture and stock a large line of hose and belting ducks, sheetings, osnaburgs and other fabrics used by the rubber industry. Because the reliable quality of these fabrics has been demonstrated for many years, rubber engineers naturally turn to us for help in the development of new specification fabrics to meet special requirements.



West Point Osnaburg



Sheeting

WELLINGTON SEARS COMPANY
65 Worth Street • New York, N. Y.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Size	9 Mos., 1940 Number	%	9 Mos., 1939 Number	%
Drop Center Rims, 16″ Diameter and Under				
12x2.50C	.....	...	30,120	0.3
15x3.00D	66,260	0.6	107,898	1.2
15x4.50E	131,597	1.2	20,276	0.2
15x5.00E	79,140	0.7	.....	...
15x5.00F	126,186	1.2	99,679	1.1
15x5.50F	255,013	2.4	119,268	1.3
16x3.00D	25,108	0.2	.....	...
16x3.50D	161,798	1.5	214,325	2.3
16x4.00E	5,441,453	51.2	5,123,067	56.2
16x4.25E	559,391	5.3	661,436	7.2
16x4.50E	2,429,674	22.9	1,882,086	20.6
16x5.00E	147,478	1.4	.....	...
16x5.00F	1,049,118	9.9	722,791	7.9
16x5.50F	28,712	0.3	13,608	0.1
16x6.00F	10,136	0.1	9,639	0.1
Drop Center Rims, 16″ Diameter and Under Low Flange				
All Sizes	1,166	0.0	27,348	0.3
Drop Center Rims, 16″ Diameter and Over				
All Sizes	97,380	0.9	80,624	0.5
Flat Base Rims for Balloon Tires				
All Sizes	4,513	0.0	6,199	0.1
Flat Base Rims for High Pressure Passenger Tires				
All Sizes	.....	...	149	0.0
Clincher Rims				
All Sizes	2,585	0.0	891	0.0
15″ Truck and Bus Rims				
15x7	4,837	0.2	3,786	0.2
15x8	3,431	0.1	1,852	0.1
15x9/10	46	0.0	.....	...
17″ Truck and Bus Rims				
17x5	34,975	1.3	40,015	1.7
17x6	92,985	3.3	39,844	1.7
17x7	382	0.0	.....	...
18″ Truck and Bus Rims				
18x5	9,388	0.3	444	0.0
18x6	3,111	0.1	404	0.0
18x7	9,545	0.4	14,528	0.6
18x8	83,838	3.0	12,986	0.6
18x9/10	3,043	0.1	2,934	0.1
19″ Truck and Bus Rims				
19x11	4,334	0.2	.....	...
20″ Truck and Bus Rims				
20x5	408,246	14.8	426,999	18.4
20x6	1,052,910	38.1	950,220	40.9
20x7	625,781	22.7	504,558	21.7
20x8	188,613	6.8	150,230	6.4
20x9/10	26,147	0.9	20,825	0.9
20x11	2,655	0.1	1,543	0.1
22″ Truck and Bus Rims				
22x7	143	0.0	310	0.0
22x8	13,106	0.5	10,399	0.4
22x9/10	10,715	0.4	4,828	0.2
24″ Truck and Bus Rims				
24x6	6,963	0.3	5,530	0.2
24x7	4,807	0.2	2,675	0.1
24x8	6,010	0.2	2,259	0.1
24x9/10	13,375	0.5	6,631	0.3
24x11	2,204	0.1	5,428	0.2
Semi-Drop Center Rims, 16″ for Light Trucks				
16x4.50E	22,944	0.8	46,036	2.0
16x5.50F	128,540	4.7	67,258	2.9
Drop Center Tractor and Implement Rims				
12x2.50C	5,269	0.8	4,326	1.5
12x3.00D	14,776	2.3	7,185	2.5
13x5.50F	9,095	1.4	4,902	1.7
15x2.50C	17	0.0	.....	...
15x3.00D	65,727	10.3	9,764	3.3
15x4.50E	.....	...	275	0.1
16x3.00D	7,687	1.2	5,034	1.7
16x5.50F	.....	...	146	0.0
18x2.50C	1,695	0.3	.....	...
18x3.00D	2,163	0.3	579	0.2
18x3.25E	1,069	0.2	.....	...
18x4.19F	773	0.1	.....	...
18x5.50F	12,478	2.0	17,429	6.0
19x3.00D	56,938	8.9	5,981	2.1
19x4.00E	.....	...	170	0.1
20x4.50E	7,856	1.2	3,191	1.1
20x5.50F	11,978	1.9	3,964	1.4
21x3.00D	6,744	1.0	672	0.2
21x3.25E	5,088	0.8	.....	...
22x4.50E	7,997	1.3	9,004	3.1
24x3.00D	814	0.1	63	0.0
28x4.00E	.....	...	152	0.
30x3.00D	977	0.1	108	0.0
36x3.00D	1,749	0.3	1,132	0.4
36x4.00E	.....	...	87	0.0
36x4.50E	2,197	0.3	3,202	1.1
40x3.00D	474	0.1	92	0.0
40x4.50E	.....	...	184	0.0
44x4.00E	.....	...	38	0.0
44x4.50E	.....	...	205	0.1
24x5.50R	4,534	0.7	24,061	8.3
32x5.50R	96	0.0	.....	...
36x5.50R	830	0.1	9,843	3.4
40x5.50R	1,535	0.2	3,978	1.4
20x8.00T	2,147	0.3	2,091	0.7
24x6.00S	6,025	0.9	5,389	1.8
24x8.00T	39,736	6.2	46,534	15.8
28x6.00S	1,320	0.2	785	0.3
28x8.00T	25,462	4.0	18,048	6.2
32x6.00S	.....	...	88	0.0
32x8.00T	7,677	1.2	7,715	2.7
36x6.00S	17,844	2.8	27,245	9.4
36x8.00T	29,920	4.8	52,305	18.1
40x6.00S	6,118	1.0	12,301	4.3
40x8.00T	1,396	0.2	1,169	0.4
42x8.00T	89	0.0	130	0.0
W 7-24	30,655	4.8	.....	...
W 8-24	60,732	9.5	.....	...
W 9-24	59	0.0	.....	...
W10-24	78	0.0	.....	...
W11-24	975	0.1	.....	...
W 6-28	637	0.1	.....	...
W 8-28	378	0.1	.....	...
W 9-28	6,008	0.9	.....	...
W10-28	17,698	2.8	.....	...
W11-28	408	0.1	.....	...
W 6-32	10,827	1.7	.....	...
W 7-32	16,047	2.5	.....	...
W 8-32	2,296	0.4	.....	...
W11-32	465	0.1	.....	...
W 6-36	500	0.1	.....	...
W 7-36	2,184	0.3	.....	...
W 8-36	3,737	0.6	.....	...
W 9-36	3,067	0.5	.....	...
W10-36	11,777	1.8	.....	...
W 7-38	5,789	0.9	.....	...
W 8-38	8,173	1.3	.....	...
W 9-38	8,083	1.3	.....	...
W10-38	1,756	0.3	.....	...
W 4-40	462	0.1	.....	...
W4.5-40	599	0.1	.....	...
W 5-40	321	0.1	.....	...
W 8-40	2,023	0.3	.....	...
W 9-40	187	0.0	.....	...
W10-40	2,629	0.4	.....	...
W 4-44	151	0.0	.....	...
W4.5-44	120	0.0	.....	...
W 5-44	399	0.1	.....	...
W 6-44	1,957	0.3	.....	...
DW11-24	473	0.1	.....	...
DW 9-26	215	0.0	.....	...
DW10-26	1,768	0.3	.....	...
DW11-26	350	0.1	.....	...
DW11-28	2,232	0.3	.....	...
DW11-30	331	0.1	.....	...
DW12-30	2,282	0.4	.....	...
DW11-32	592	0.1	.....	...
DW 9-36	1,574	0.2	.....	...
DW10-36	1,049	0.2	.....	...
DW11-36	1,995	0.3	.....	...
DW 7-38	193	0.0	.....	...
DW 8-38	7,904	1.2	.....	...
DW 9-38	28,234	4.4	.....	...
DW10-38	15,027	2.4	.....	...
DW11-38	3,872	0.6	.....	...
Cast Rims				
10x5.00F	604	33.2	469	29.1
10x6.00F	352	19.4	538	33.4
20x11.25	2	0.1	.....	...
24x10.00	16	0.9	.....	...
24x11.25	9	0.5	.....	...
24x13.00	91	5.0	3	0.2
24x15.00	697	38.4	599	37.2
32x17.00	10	0.6	.....	...
32x18.00	16	0.9	.....	...
40x15.00	18	1.0	.....	...
Airplane Rims				
All Sizes	2,437	0.0	2,566	0.0
Totals	14,021,592		11,735,668	

Tire Production Statistics

Pneumatic Casings

	Inventory	Production	Shipments
1938	8,451,390	40,906,735	43,132,302
1939	8,664,505	57,612,731	57,508,775
1940			
Jan.	9,347,953	4,953,585	4,270,137
Feb.	10,123,824	4,888,250	4,112,379
Mar.	10,747,370	5,007,042	4,345,674
Apr.	10,881,029	5,105,953	5,009,762
May	10,576,217	5,415,314	5,720,249
June	8,881,101	5,147,871	6,926,553
July	9,299,014	4,706,525	4,314,799
Aug.	9,732,108	4,621,223	4,173,508
Sept.	9,886,022	4,416,587	4,511,664
Oct.	9,447,962	5,081,939	5,560,709

Pneumatic Casings

	Original Equipment	Replacement Sales	Export Sales
1938	10,716,130	30,565,008	1,048,934
1939	18,207,556	38,022,034	1,279,185
1940			
Jan.	1,804,826	2,376,455	88,856
Feb.	1,974,466	2,051,487	86,426
Mar.	2,050,250	2,217,627	77,797
Apr.	2,095,220	2,823,293	91,249
May	1,998,735	3,635,652	85,862
June	1,925,420	4,918,341	82,792
July	857,684	3,377,166	79,949
Aug.	704,565	3,386,629	82,314
Sept.	1,464,925	2,948,797	97,942
Oct.	2,322,313	3,098,371	104,025

Inner Tubes

	Inventory	Production	Shipments
1938	8,165,696	37,847,656	40,292,614
1939	7,035,671	50,648,556	51,190,314
1940			
Jan.	7,633,798	4,286,924	3,826,667
Feb.	7,896,960	4,210,904	3,809,733
Mar.	8,182,655	4,399,550	4,113,735
Apr.	8,258,331	4,618,361	4,542,735
May	8,243,050	4,739,072	4,738,668
June	6,841,281	4,359,486	5,721,096
July	7,093,996	4,027,495	3,792,962
Aug.	7,802,303	4,313,813	3,599,626
Sept.	7,950,164	4,107,109	3,952,504
Oct.	7,950,462	4,556,593	4,877,770

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1938	26,606,048	$ 4,147,318
1939	61,460,003	10,467,552
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007
July	5,109,739	993,411
Aug.	5,102,983	1,022,531
Sept.	6,614,718	1,337,487

Data from Leather and Rubber Division, Washington, D. C.

U. S. Crude and Waste Rubber Imports for 1940

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1940	Totals 1939	Miscellaneous Balata	Miscellaneous	Waste
Jan. ....tons	68.856	2,768	406	161	74	255	72,520	37,082	107	648	241
Feb.	40,338	1,458	553	453	30	256	43,088	31,038	75	316	34
Mar.	50,027	2,720	119	49	42	320	59,277	45,724	89	659	26
Apr.	66,688	3,219	374	97	12	309	70,699	32,031	63	581	8
May	47,321	2,883	729	186	24	288	51,431	45,886	150	596	204
June	50,785	2,365	267	146	1	325	53,889	34,363	83	494	20
July	67,077	1,586	494	139	54	246	69,596	37,372	152	345	7
Aug.	70,102	2,038	282	206	73	327	73,028	38,585	52	834	107
Sept.	75,239	2,475	794	...	185	280	78,973	37,689	49	1,038	97
Oct.	72,127	1,044	510	461	190	364	74,696	45,628	73	987	161
Total 10 mos., 1940 ....tons	614,560	22,556	4,528	1,898	685	2,970	647,197	.....	893	6,498	905
Total 10 mos., 1939 ....tons	358,396	18,255	3,665	2,657	231	2,194	.....	385,398	732	6,527	1,034

Compiled from The Rubber Manufacturers Association, Inc., statistics.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

RUBBER CHEMIST, ELEVEN YEARS' EXPERIENCE WITH large and small companies in compounding and processing rubber goods and all synthetics, here and abroad. Good experience with latex, airfoam sponge, cushions, and dipped goods. Available on short notice. Location immaterial, also South America. Excellent references. Practical man. 37 years old. Address Box No. 179, care of INDIA RUBBER WORLD.

CHEMIST, TWENTY-TWO YEARS' VARIED EXPERIENCE, including reclaiming and preparation and evaluation of mineral fillers. Address Box No. 180, care of INDIA RUBBER WORLD.

COMPETENT SUPERINTENDENT OF PRODUCTION OR DEVELopment work desires change. Years of experience with major and small concerns. Able compounder, labor supervisor, etc. Well educated. Accomplished engineer for mechanicals, sponge rubber and synthetic rubber products. Address Box No. 185, care of INDIA RUBBER WORLD.

EXPERIENCED EXECUTIVE OF DEVELOPMENT, PRODUCTION, or sales in all phases of soft mechanicals and hard rubber. Now employed, but desirous of making change. Address Box No. 186, care of INDIA RUBBER WORLD.

CHEMIST, COMPOUNDER, EXPERT IN SYNTHETICS, 16 YEARS' experience in development work, compounding and production, successful in manufacturing of aeronautical and automotive goods and rubber clothing, wishes connection with first-class rubber company. Address Box No. 188, care of INDIA RUBBER WORLD.

FOREMAN, COMPOUNDING, TESTROOM, CONtrolroom, very exact, very quick, 15 years' experience, mechanical, seamless, spreading, will accept position. Address Box No. 189, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

SALESMAN: CHEMICALS, RUBBER TRADE ILLINOIS, INDIANA, Wisconsin. Experience not essential, although some knowledge rubber compounding required; preferably Chemical Engineer. Preference given young Gentile 23-27 with car, willing to start nominal salary. State education, religion, experience. Our employes know of this advertisement. Address Box No. 184, care of INDIA RUBBER WORLD.

RUBBER COMPOUNDER. COLLEGE GRADUATE. THREE TO five years' experience in compounding and processing Mechanical Rubber Goods. Experience in Extruded Goods preferred. Large manufacturer in the East. State age, education, experience, and salary desired. Address Box No. 190, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

DON'T FAIL TO READ AD "A REAL OPPORTUNITY" UNDER "Machinery and Supplies For Sale." This is a going business.

ROYALTIES PAID
ON ROLL IMPROVEMENTS
A long-established Massachusetts concern specializing in the manufacture of wood, metal, and rubber rolls will pay royalties for exclusive manufacturing and sales rights on roll improvements. Address Box No. 176, care of INDIA RUBBER WORLD.

COMPLETE PLANT FOR MANUFACTURING LATEX products in New York. Address Box No. 182, care of INDIA RUBBER WORLD.

TRENTON PLANT PREPARED TO DO CUSTOM MILLING, expert compounding and process work for all requirements. Address Box No. 187, care of INDIA RUBBER WORLD.

FOR SALE: ONE RUBBER FACTORY AT HUDSON, MASSACHUsetts, equipped with Spreaders, Churns, Saturators, etc., power plant, small machine shop. Address Lawrence N. Barry, 41 Locust Street, Medford, Massachusetts.

(Advertisements continued on page 95)

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	May, 1940		June, 1940	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc.....*lb.*	6,699,666	$1,377,082	2,322,194	$509,430
Latex (dry weight).....*lb.*	261,305	80,256	55,634	18,422
Gutta percha .....*lb.*	50	42	.....	.....
Rubber, recovered.....*lb.*	1,202,900	64,502	1,202,100	64,648
Rubber, powdered, and gutta percha scrap .....*lb.*	614,100	13,669	698,100	8,978
Balata .....*lb.*	3,944	1,181	4,043	1,473
Rubber substitute .....*lb.*	37,900	9,708	18,000	6,384
Totals	8,819,865	$1,546,440	4,300,071	$609,335
PARTLY MANUFACTURED				
Hard rubber comb blanks...	.....	$4,005	.....	$5,197
Hard rubber, n. o. s.....*lb.*	1,169	1,200	1,893	1,678
Rubber thread no covered.*lb.*	3,847	3,684	3,951	3,612
Totals	5,016	$8,889	5,844	$10,487
MANUFACTURED				
Bathing shoes .....*prs.*	14,919	$3,792	2,530	$544
Belting	.....	14,055	.....	8,849
Hose	.....	13,600	.....	21,094
Packing	.....	5,830	.....	8,569
Boots and shoes.....*prs.*	1,013	868	611	436
Canvas shoes with rubber soles .....*prs.*	27,824	7,814	52,348	15,538
Clothing, including waterproofed	.....	5,481	.....	6,057
Raincoats .....*no.*	3,129	11,883	986	6,170
Gloves .....*doz. prs.*	757	2,407	350	1,465
Hot water bottles.....	.....	766	.....	.....
Liquid rubber compound....	.....	43,857	.....	.....
Tires, bicycle .....*no.*	4,419	2,370	1,753	1,682
Pneumatic .....*no.*	2,272	55,492	4,972	110,548
Solid for automobiles and motor trucks .....*no.*	10	534	30	1,348
Other solid tires.....	.....	1,224	.....	1,738
Inner tubes .....*no.*	742	2,224	3,583	11,171
Bicycle .....*no.*	1,350	251	1,704	376
Mats and matting.....	.....	6,293	.....	3,794
Cement	.....	12,428	.....	10,202
Golf balls .....*doz. prs.*	6,987	12,857	5,273	10,980
Heels .....*prs.*	16,450	1,343	8,910	867
Other rubber manufactures..	.....	171,508	.....	140,554
Totals	.....	$376,877	.....	$361,982
Totals, rubber imports..	.....	$1,932,206	.....	$981,804

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$6,163	.....	$14,937	.....
MANUFACTURED				
Belting	$30,323	.....	$40,047	.....
Bathing caps	.....	.....	.....	.....
Canvas shoes with rubber soles	31,059	.....	20,752	.....
Boots and shoes	209,085	.....	323,793	.....
Clothing, including waterproofed	18,082	.....	18,467	.....
Heels	15,115	.....	11,905	.....
Hose	79,445	.....	22,351	.....
Soles	12,864	.....	13,346	.....
Soling slabs	3,178	.....	2,077	.....
Tires, pneumatic	447,685	.....	371,501	.....
Not otherwise provided for	.....	.....	.....	.....
Inner tubes	30,072	.....	49,063	.....
Other rubber manufactures..	59,029	.....	44,994	.....
Totals	$935,937	.....	$918,296	.....
Totals, rubber exports...	$942,100	.....	$933,233	.....

Imports by Customs Districts

	September, 1940		September, 1939	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Vermont	.....	.....	850	$128
Massachusetts	16,918,163	$3,144,873	12,326,338	2,024,727
St. Lawrence	.....	.....	4,690	715
Buffalo	.....	.....	3,428	343
New York	122,842,085	21,327,842	56,805,120	9,243,398
Philadelphia	2,724,663	470,919	1,329,096	220,451
Maryland	13,894,149	2,344,017	1,894,851	292,567
Mobile	1,535,324	263,510	1,322,495	189,381
New Orleans	8,183,297	1,391,626	2,673,697	419,334
Galveston	67,244	10,302	49,564	7,409
El Paso	100,800	8,746	44,800	4,399
Los Angeles	9,586,868	1,556,763	7,261,733	1,153,711
San Francisco	1,045,424	186,274	571,436	89,896
Oregon	.....	.....	33,600	5,324
Ohio	.....	.....	57,229	11,663
Totals	176,898,017	$30,704,872	84,378,927	$13,663,446

*Crude rubber including latex dry rubber content.

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

LIQUIDATING: 1—Farrel 24"x24" 12 deck, Hydraulic Press, 15" ram; 12—24"x28" Hydraulic Presses, 14" ram; 7—Triplex Hydraulic Pumps, 18 to 35 GPM, 1500 to 3000 lbs. per sq. inch; also Mills, Calenders, Tubers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: ONE 68 H.P. BERTHOLD ELECTRIC MOTOR, 220 Volts, 208 Amps., 300 R.P.M. In Akron, O. Address Box No. 177, care of INDIA RUBBER WORLD.

A REAL OPPORTUNITY

Complete plant—going business—for sale at a sacrifice, due to the death of the owner. A small mechanical goods plant located in Ohio operating 24 hours a day on mechanical and extruded products with contracts extending from 8 months to a year. This business is showing a definite profit and is manned by efficient and capable men. Labor conditions are ideal. The business will be sold as is, as the widow does not desire to continue operation. An excellent opportunity here for expansion. Sales are developed by experienced men on a brokerage basis. Products now made are diversified. $20,000 will handle. Some terms to reliable party. Write for details to Box No. 181, care of INDIA RUBBER WORLD.

FOR SALE: ONE USED RECONDITIONED 4½" RAPIDO TUBING Machine. Complete specifications furnished upon request. Address Box No. 183, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED FOR USER: 1—NO. 3 OR NO. 9 BANBURY MIXER; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. No dealers. Address Box No. 178, care of INDIA RUBBER WORLD.

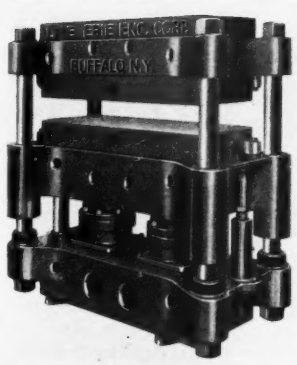
LIQUIDATION RUBBER MACHINERY. Including one Birmingham 42" three-roll Calender, one Thropp 6" x 16" Laboratory Mill, one Thropp 42" two-roll Mill, two U. S. Bureau of Standards Dynamometer Testing Apparatus, Lot of complete Tire Molds, 75' Link-Belt Conveyer, 36" wide. Also many other items available.

Address

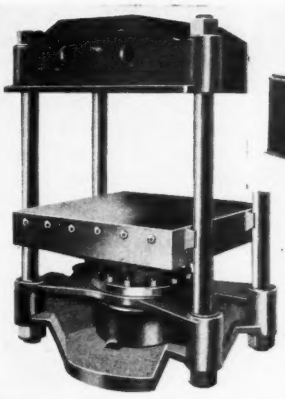
Box No. 191, care of INDIA RUBBER WORLD

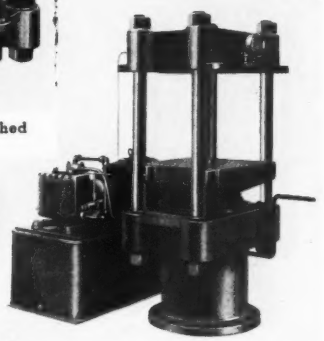
SPECIALIZING IN **USED MACHINERY** FOR THE **RUBBER** AND ALLIED INDUSTRIES

ERIC BONWITT — AKRON, OHIO



Detailed specifications furnished upon request.





USED HYDRAULIC PRESSES

for immediate delivery — several different models — 10 to 300 tons — most have steam platens for rubber mould work — sold "as is" or will rebuild them for you — only 22 available so act promptly.

Hydraulic Machinery, Inc.

Hydraulic Engineers
Hydraulic Power Units and Installations, Special Machines

9363 American Ave.
Detroit Michigan

HYDRAULIC VALVES

Operating, Globe, Angle, or Check Valves—Hydraulic Presses, Accumulators, Pumps, etc. —For almost any size or pressure.

Dunning & Boschert Press Co., Inc.

336 W. WATER ST. SYRACUSE, N. Y.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS

UNITED

HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

319-323 FRELINGHUYSEN AVE. CABLE "URME" NEWARK, N. J.

World Wide Service

by

The World's Largest Rebuilder of Rubber Mill Machinery!

FACTORY REBUILT and GUARANTEED RUBBER MILL MACHINERY

Accumulators	Mills	Churns	Spreaders
Calenders	Pumps	Motors	Vulcanizers
Cutting Machines	Mixers	Presses	Tubers

"Equipped to Furnish Complete Plants"

L. ALBERT & SON

OFFICES AND PLANTS

TRENTON, N. J. ★ AKRON, OHIO ★ LOS ANGELES, CALIF.

European Office — Andre Berjonneau, 33 Blvd. des Batignolles, PARIS (VIII) FRANCE
Villers-Sur-LeRoule par Gaillon (Eure) FRANCE

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	August, 1940 Quantity	August, 1940 Value	Eight Months Ended August, 1940 Quantity	Eight Months Ended August, 1940 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids)....*lb.*	5,102,983	$1,022,531	52,322,834	$9,985,292
Jelutong or pontianak....*lb.*	1,571,077	276,642	9,054,729	1,326,155
Balata ....*lb.*	137,580	22,638	935,407	159,753
Gutta percha ....*lb.*	372,588	69,015	2,963,540	479,891
Guayule ....*lb.*	665,548	59,464	5,224,121	489,703
Scrap and reclaimed....*lb.*	933,637	14,836	6,649,750	126,082
Totals	8,783,413	$1,465,126	77,150,381	$12,566,876
Misc. rubber (above), 1,000 *lbs.*	8,783	$1,465,126	77,150	$12,566,876
Crude rubber ....1,000 *lbs.*	157,815	27,608,883	1,047,684	182,481,800
Totals ....1,000 *lbs.*	166,598	$29,074,009	1,124,834	$195,048,676
Chicle, crude ....*lb.*	60,075	$20,753	7,991,252	$2,604,182
MANUFACTURED—*Dutiable*				
Rubber tires ....*no.*	1,413	$1,448	32,934	$194,416
Rubber boots, shoes and overshoes ....*prs.*	3,996	651	64,752	16,374
Rubber soled footwear with fabric uppers ....*prs.*	156,220	26,257	887,606	165,452
Golf balls ....*no.*	4,800	584	523,918	48,556
Lawn tennis balls....*no.*	12,984	1,150	908,685	89,047
Other rubber balls....*no.*	271,386	593	1,481,735	43,365
Other rubber toys....	.....	428	.....	19,488
Hard rubber combs....*no.*	.....	.....	.....	.....
Other manufactures of hard rubber	.....	1,549	.....	23,378
Friction or insulating tape..*lb.*	3,150	2,898	50,150	30,586
Belts, hose, packing, and insulating material	.....	14,896	.....	72,221
Druggists' sundries of soft rubber	.....	1,222	.....	27,222
Inflatable swimming belts, floats, etc. ....*no.*	2,072	163	428,843	29,046
Other rubber and gutta percha manufactures	.....	22,734	.....	219,292
Totals	.....	$74,573	.....	$978,443

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ....*lb.*	931,164	$183,369	12,871,462	$2,578,035
Balata ....*lb.*	40,700	14,848	301,132	95,218
Other rubber, rubber substitutes and scrap....*lb.*	5,634	697	172,147	23,697
Rubber manufactures (including toys)	.....	874	.....	29,403
Totals	.....	$199,788	.....	$2,726,353

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ....*lb.*	2,911,683	$130,061	18,469,764	$924,021
Scrap ....*lb.*	9,002,649	210,167	54,962,536	1,036,375
Cements ....*gal.*	27,476	29,778	295,838	375,081
Rubberized auto cloth..*sq. yd.*	27,322	10,590	182,660	80,399
Other rubberized piece goods and hospital sheetings..*sq. yd.*	208,945	88,590	1,583,373	571,243
Boots ....*prs.*	3,518	7,852	82,642	172,908
Shoes ....*prs.*	7,609	8,414	136,583	86,988
Canvas shoes with rubber soles ....*prs.*	51,541	44,167	404,040	326,114
Soles ....*doz. prs.*	2,901	6,754	30,747	60,095
Heels ....*doz. prs.*	30,973	18,459	197,760	114,786
Soling and top lift sheets..*lb.*	11,936	2,896	457,846	89,208
Gloves and mittens..*doz. prs.*	9,162	21,818	77,474	182,696
Water bottles and fountain syringes ....*no.*	47,910	15,495	228,161	76,014
Other druggists' sundries....	.....	59,794	.....	546,949
Gum rubber clothing....*doz.*	24,253	33,854	157,321	354,388
Balloons ....*gross*	16,667	15,691	151,901	132,629
Toys and balls....	.....	29,897	.....	111,985
Bathing caps....*doz.*	5,562	9,685	40,653	71,278
Bands ....*lb.*	9,075	3,903	139,058	65,858
Erasers ....*lb.*	15,034	8,694	174,982	100,169
Hard rubber goods				
Electrical battery boxes..*no.*	19,050	14,031	177,068	124,654
Other electrical....*lb.*	40,758	9,380	366,180	139,691
Combs, finished....*doz.*	17,029	11,744	154,938	88,416
Other hard rubber goods....	.....	15,192	.....	114,538
Tires				
Truck and bus casings..*no.*	57,836	1,662,257	314,795	7,126,067
Other auto casings.....*no.*	33,124	379,609	357,296	3,930,221
Tubes, auto ....*no.*	79,482	225,214	509,408	1,062,890
Other casings and tubes..*no.*	12,957	175,152	74,318	653,316
Solid tires for automobiles and motor trucks....*no.*	216	6,354	3,432	71,223
Other solid tires....*lb.*	170,368	25,327	293,227	50,662
Tire sundries and repair materials ....*lb.*	157,460	46,637	1,777,319	501,325
Rubber and friction tape..*lb.*	44,462	14,107	532,720	149,467
Fan belts for automobiles..*lb.*	33,495	15,382	274,741	146,607
Other rubber and balata belts ....*lb.*	273,375	160,077	2,167,920	1,159,190
Garden hose ....*lb.*	112,464	35,426	627,783	129,341
Other hose and tubing....*lb.*	1,058,142	445,597	6,053,427	2,492,114
Packing ....*lb.*	123,672	64,157	964,902	470,160
Mats, matting, flooring, and tiling ....*lb.*	72,731	9,431	738,887	103,532
Thread ....*lb.*	33,675	39,421	554,254	406,251
Gutta percha manufactures..*lb.*	14,300	6,750	1,003,164	304,455
Latex (d.r.c.) and rubber sheets processed for further manufacture....*lb.*	95,307	26,867	891,020	246,879
Other rubber manufactures..	.....	152,059	.....	1,549,575
Totals	.....	$4,296,730	.....	$26,499,758